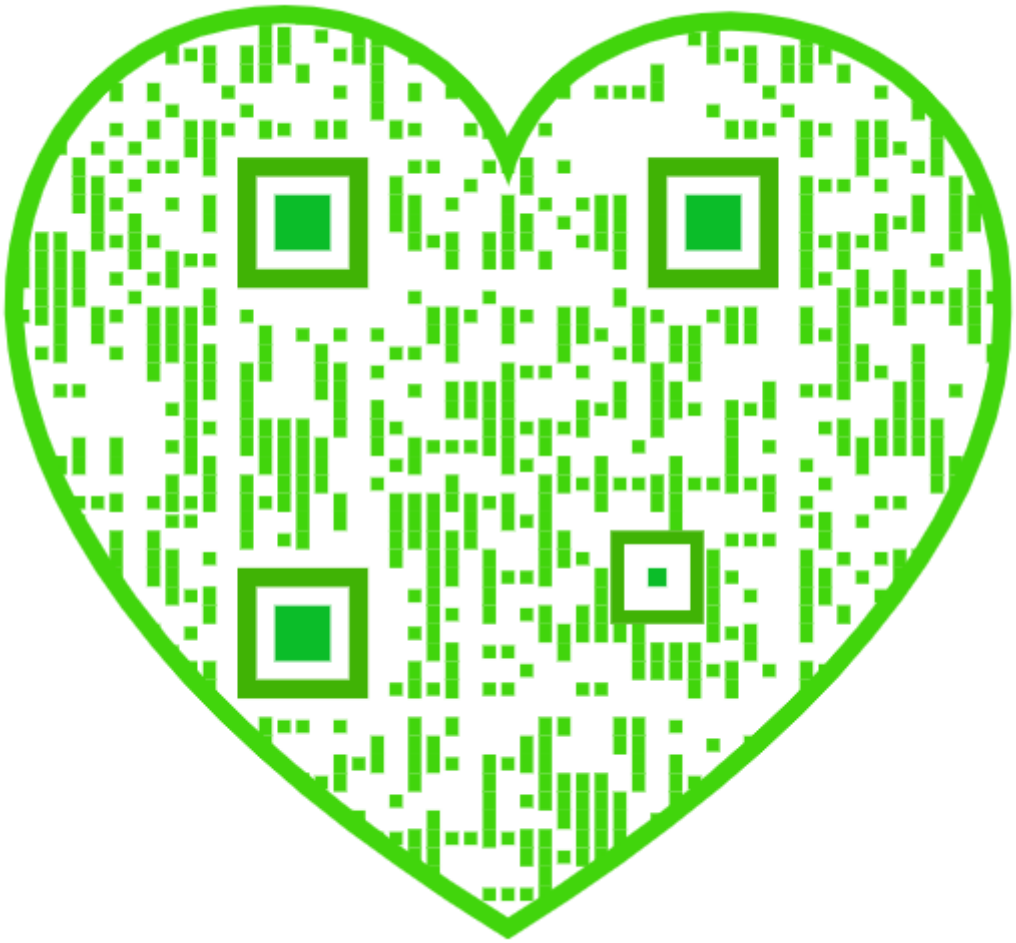

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DISEASES

OF

HORSES AND CATTLE

WRITTEN ESPECIALLY FOR THE

FARMER, STOCKMAN AND VETERINARY STUDENT.

By D. McINTOSH, V. S.

PROFESSOR OF VETERINARY SCIENCE IN THE UNIVERSITY OF ILLINOIS;
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PREFACE.

In consequence of the urgent solicitations of numerous farmer friends that I should, for their benefit, and that of thousands of other farmers and stockmen in the United States, publish my twenty-five years' experience in the treatment of horses and cattle, I have undertaken this work, especially on account of my new discoveries in the treatment of some diseases, by which they have greatly benefited, such as the discovery of the true nature of that very fatal disease known as "Milk Fever." The theory which was taught and written on this subject, namely, Parturient Apoplexy or Congestion of the Brain and Spinal Cord, is not correct, the disease being purely of a nervous character, causing a partial paralysis of the spinal cord and brain, and when treated accordingly the majority of cases recover. This has been of great pecuniary value, as thousands of valuable cows die annually from this disease, and as this work gets into the hands of the greater number of farmers and dairymen it will be a saving of thousands of dollars to them. My new methods of treating "Fistula of the Withers," "Poll Evil," and all kinds of wounds from barb wire, will be worth ten times the price of the book. Also my experience in the care of horses' feet, and

the successful treatment of the same. There are also some new and valuable hints on "Parturition," which will enable the stockmen and farmers to deliver safely those difficult cases of parturition in both mare and cow without the use of instruments. All other diseases are treated in the latest methods by the medicines with which I have had the most success. This volume will also be of very great service to the student in veterinary science, as well as the young practitioner, as they will find the experience of twenty-five years of successful practice and teaching. The book is written so that anyone can understand it, technicalities having been avoided as far as possible. The need of such a practical work on the diseases of horses and cattle has long been felt, and in offering it to the stockman and farmer I do it with a certain knowledge that it will accomplish for him all I claim for it.

INTRODUCTION.

METHODS OF ADMINISTERING MEDICINE.

There are several ways in which medicine can enter the system: By the mouth, by the lungs and air passages (by inhalation), under the skin (hypodermic), and by the rectum. But the most convenient and safest plan for the farmer and stockman is by the mouth. One form is the ball, which is made by pulverizing the substance and mixing it with a little lard or syrup to the consistency of a dough for making bread, then roll it up in a small piece of tissue paper, using a little gum to make it stick. The ball should not be too large, not exceeding the size of one's thumb. If there is too much material make it into two balls instead of having one too large. Balls should be used fresh; when they are old and hard they may pass through without being digested. Powders should be finely ground, so that they will dissolve easily in the stomach, and therefore act more quickly. Medicine in the form of powders, such as sulphate of iron and copper, are too irritating to be given as they are, as they would irritate the mouth, and should be given in bran mash or oatmeal gruel. The vegetable powders, such as gentian, are too bitter to give in mashes to horses,

but cows will usually take them. When it is necessary to give a horse such medicines as gentian and nux vomica, if it will not eat it in bran mash, give it as a drench in a quart of oatmeal gruel. Oils and liquid medicines are best given as drenches, with the exception of Fowler's solution of arsenic, which should be given in the food. Giving the medicine as a drench is the easiest method for the farmer and stockman unless he has a balling iron.

Method of Giving a Drench to the Horse.—Put on a halter with a nose band, then take a small rope or strap and make a noose about a foot long, push this down under the nose band of the halter, then into the mouth, and by this noose pull up the head to a little above the level of the neck, so that the medicine will not run down out of the mouth. If the animal will not swallow tickle the roof of the mouth with the fingers or the neck of the bottle. Do not draw out the tongue nor pinch its throat, as it may cause the animal to cough, and it will either lose the medicine in its mouth or some of it may pass into the windpipe. Great patience is required in giving a horse a drench. Medicine should not be given by the nose, as it is apt to get into the windpipe, causing great irritation, and probably the death of the animal. If the horse should cough, let the head down until it ceases, then elevate the head as before. Never put too much in its mouth at once; give it in small quantities, and when it swallows give a little more, and so on until all is taken.

Drenching cattle is much easier accomplished

than drenching horses. Their pallet is short, and they cannot retain the medicine in the mouth as the horse does. In drenching cattle one man stands on the left side of the animal and takes hold of its horns; if it has no horns he takes hold of its ears, or places his arms around its neck; the man that gives the medicine stands on the right side and places his thumb and index finger in the animal's nose and holds fast to it, the animal of its own accord then holds up its head; have the bottle containing the medicine in the right hand, place the neck of the bottle into the side of the mouth and pour in a little at a time as the animal swallows until all is taken. Cattle should not get medicine in ball form, as it would likely pass into the paunch and remain there for some time. Epsom salts is the best physic for cattle in ordinary cases where a physic is needed. The dose for an adult cow is from one to one and a half pounds mixed with from a half to an ounce of ginger, dissolved in half a gallon of cold water. For a two-year-old three-fourths of a pound; for a one-year-old, half a pound. Aloes is the proper physic for horses unless otherwise ordered. Dose for an adult horse, six to eight drams; for a three-year-old, from four to six drams; for a two-year-old, three to five drams; raw linseed oil is the most suitable in cases of irritation of the stomach, bowels and kidneys; dose, one pint to one quart.

PULSE OF THE HORSE.

This is best found on the lower jaw, where the artery crosses the jaw on its lower edge, about two

inches forward from its angle. The pulse beats in the horse from thirty-six to forty per minute in health, but may run up to over one hundred in disease.

PULSE OF CATTLE.

The pulse in cattle is found on the lower jaw, about the same place as in the horse, only a little more to the outside. The number of pulsations per minute in the cow is forty-five to fifty in health.

TEMPERATURE.

The average temperature of the horse in health is from ninety-nine and a half to one hundred and one and a half; in cattle ninety-nine to one hundred and two. In disease, the temperature may rise as high as one hundred and seven or even higher and the animal live. In animals the temperature is best taken in the rectum; the instrument can be purchased from any of the instrument makers.

RESPIRATION.

When respiration is undisturbed it usually maintains a constant standard. In the adult horse it varies from nine to twelve in the minute; in adult cattle from fifteen to twenty. It is faster in young animals. Exercise increases for the time being the number; but after the animal has rested for a few minutes it falls to its normal standard. If it should keep up after being rested it indicates that there is some disturbance; in this case the pulse should be examined, and if it is not accelerated, that will indicate that there is nothing serious; on the other

hand, if it should be accelerated, it will indicate that the animal is sick. Both horses and cattle will breathe a little faster and heavier when their stomachs are distended.

DISEASES OF HORSES AND CATTLE.

CHAPTER I.

DISEASES OF THE ORGANS OF MASTICATION.

The diseases and mechanical impediments to the mouth and teeth are very common in the horse, and they are often overlooked until the animal is very much emaciated. A horse was brought to me in the following condition: Saliva dropping from the mouth, and if the animal was offered food it would greedily take it into its mouth and try to chew it, then drop it out, and if water was given it would try to drink, but could swallow very little of it. The horse had been in this condition for five days, and had lost flesh rapidly, and was weak. I examined the mouth and could not see anything wrong at first, but the symptoms indicated that the trouble was in the mouth. I twitched the nose, and taking the tongue in my hand, drawing it to one side and passing the tooth rasp between the cheek and the molar teeth, I discovered that the fourth molar tooth was split, the smallest portion sticking partially in the gum and muscles of the cheek. This I removed by pressing the end of the

rasp against it. The horse began to eat at once. Another horse showed the same symptoms except that it could swallow water. In this case I found a piece of corn cob wedged between the upper molar teeth; so firm was it fixed that I had to cut it before it could be removed. Another case to illustrate an injury to the tongue. The animal could eat soft food, but hay, oats, and corn dropped out of the mouth as soon as it was taken in. The symptoms were the same as above. I examined the mouth and found that the tongue was cut one-third of the way through, and the sore had become unhealthy, as the animal had been in this condition three weeks. I cleaned the wound and touched it with nitrate of silver to destroy the unhealthy part, then used to heal it: Glycerine, two ounces; tincture of catechu, one ounce; alum, one dram, shaken up well, and applying a little to the sore with a feather twice daily. The animal was fed on ground oats and bran until the wound healed. There are numbers of cases which I could enumerate where if the owner had examined the mouth he would have saved the poor animal from suffering and himself trouble and expense.

IRREGULARITIES OF THE TEETH.

The outer edges of the upper molars and the inner edges of the lower molars are sharp and sometimes cut the cheeks or the tongue and prevent the horse from eating well. This is best remedied by rasping off the sharp points, taking care not to rasp the grinding surface of the tooth.

Elongated Teeth.—Sometimes we will find one or more of the molar teeth elongated, and interfering with mastication. In this case the elongated portion requires to be cut off and the edges rasped. Young horses from two to four years old suffer from the development of permanent molars in their sockets behind the temporary ones before they drop out, causing a swelling of the jaw. If there is a discharge from the nose, it will be necessary to remove the temporary, and in some cases the permanent ones also. If there is no discharge, it is best not to interfere, and as soon as the temporary tooth drops out and the permanent one grows down the swelling will disappear. Horses suffer sometimes from decayed teeth. The symptoms are well described by Bouley. First: Remarkable fetor, which is peculiar to the disease, and pervades the mouth and the saliva within it. Second: Flow of saliva from the mouth. Third: The appearance of a black spot on the carious tooth, or a cavity varying in extent according to the duration of the disease. Fouth: Sharp pain indicated when the tooth is struck by any instrument. Fifth: Swelling of the gums, redness and pain around the diseased tooth. Sixth: The accumulation of food about the diseased tooth, and which, undergoing putrefaction, produces the most repulsive smell. It should be removed and the part cleaned out once a day for a few days and washed with a teaspoonful of carbolic acid in a pint of water.

LAMPAS.

Lampas is a swelling of the mucous membrane called the bars. This is no disease, but the result of the development of the teeth causing an increased quantity of blood to the part, which will pass away as soon as the teeth are full grown. In very bad cases a few pricks with a suture needle and bathing the mouth with a teaspoonful of alum in half a pint of cold water will relieve it for a time. The animal should be fed on soft food. In horses that have a full mouth of teeth, give a dose of aloes, one ounce; soda carbonate, half an ounce; ground ginger, half an ounce; dissolve in half pint of boiling water, then add half a pint more of cold water and give at one dose.

INFLAMMATION OF MOUTH AND TONGUE.

This is usually the result of giving too irritating medicine or the animal eating some acid plants among the grass or hay. The symptoms are swelling of the tongue, dribbling of saliva, and if the swelling is great the tongue will be protruded from the mouth, which being open, gives the animal a peculiar appearance; the breathing is loud and rough, and the animal is unable to eat or drink and would soon die if not relieved. A horse presenting the above symptoms was brought to me in the morning and I used the following: Acetate of lead, one ounce, dissolved in half a gallon of water; I tied a piece of string to a soft sponge and wet it with the lotion and pressed it as far into the mouth as possible; I then withdrew it and in ten minutes

repeated the operation, and so on until afternoon. The swelling had gone down so that the animal could drink some water and by the following morning the animal could eat soft food. I have used this treatment in several cases of the same kind with the best results. There is no danger of poisoning with the lead lotion, as the greater part of it will drop out. Lolling the tongue may be a habit or it may be caused by paralysis of the muscles of the tongue. If it is the former, it will only do it when the bit is in the mouth. If the latter, it will hang out all the time. In cases of paralysis give one dram of nux vomica and two drams of sulphate of iron at a dose in bran mash once a day, and continue it for three weeks if necessary. There is no remedy for lolling the tongue when it is a habit.

INJURIES TO THE MAXILLARY JOINT.

This joint is situated in front of the ear where the lower jaw forms a joint with the temporal bone, and although well protected, it is liable to injuries from kicks or blows. When the part is hot and swollen it interferes with mastication, and is best treated by putting on a halter and tightening the nose band so that the animal cannot move its jaw. Then foment the part with hot water for half an hour three or four times daily and rub in well a little of the following liniment: Tincture of opium, two ounces; tincture of arnica, two ounces; tincture of aconite, one ounce; water, half pint. Or, acetate of lead, half ounce; tincture of arnica, two ounces; water, one quart. Shake up well and ap-

ply a little three times a day. After the inflammation has been reduced, apply a blister of cantharides, two drams; lard, one and a half ounces, if necessary.

Open Joint.—It sometimes happens that the wound penetrates the joint and allows the synovia to escape. This can be ascertained by the slippery, oily feeling it has between the fingers. Treatment—Reduce the inflammation by applying the above lotion and also using a blister of cantharides. Keep the jaws quiet by putting on the halter and a tight nose band. Feed the animal on oatmeal gruel, as it can suck this through its teeth while the nose band is on.

Fractures of the Jaw.—The upper jaw is not subject to this kind of injury, but the lower jaw is liable to be fractured by kicks, falls and blows. Fracture of a portion of the jaw may result from the animal's biting a hard substance. When the bone is broken a grating sound will be heard; in young animals the jaw may be split in the center, as this bone is joined in front in the young by fibrocartilage, and in the adult it hardens into bone. The fracture may be a compound one, and the bone may be splintered and the skin and soft parts wounded. Symptoms.—Difficult mastication, sometimes slight bleeding, slavering, swelling, and a distinct grating of the ends of the broken bone. Treatment.—In longitudinal fractures of the chin, tie the parts firmly together by twisting wire around the central incisor teeth, so as to hold the bones together, and bathe the part several times daily

with acetate of lead, half ounce; water, one quart.

In fractures of the neck of the jaw, a piece of smooth wood should be placed in the hollow between the jaw bones, and another piece placed on the outside of the fractured bone, then put a strong bandage around the jaws and put on the halter with the nose band buckled tight enough to keep the jaws from moving. If the part is swollen, bathe it several times a day with acetate of lead, half an ounce; water, one quart. Keep up the animal's strength by giving milk and oatmeal gruel, as much as it can suck through the mouth with the tight nose band on. In some cases the bone may be splintered. The loose pieces of bone will have to be removed and the wound left open so that it can be dressed. Use for this purpose, carbolic acid, one dram; acetate of lead, half an ounce; sulphate of zinc, half an ounce; water, one quart.

Diseases of the Salivary Glands.—The secretions of saliva are very much decreased in all fevers, especially the water, and as a result, the sick animal has a hot, clammy mouth. Some kinds of food, under certain conditions, will cause a great increase in the flow of saliva. This is noticed when a horse is turned into a pasture field which contains a good deal of white clover, when it is wet with dew or rain. Experiments made with the clover at the station did not yield any satisfactory results. If the animal is badly affected the flow of saliva can be arrested by injecting cold water into the mouth, or if the animal is taken to a stable and given a feed of dry oats, it will stop in an hour or

two. Dilatation of the salivary duct is sometimes seen in the horse. The duct from the parotid gland sometimes gets closed up by a grain of oats or other grain getting into the mouth of the duct, which opens into the mouth at the third molar tooth. Symptoms of this is a swelling on the side of the cheek about half way between the nose and the eye; it is soft to the touch. Examine the inside of the cheek, and if there is anything in the mouth of the duct remove it and pass a probe up it and the accumulated fluid will run out. Sometimes by pressing gently on the enlarged duct towards the mouth it may force it out. I have succeeded in removing it in this way. If all other means fail, open it with the knife and remove the cause, and bring the edges of the wound together by putting a pin through them and tying a thread around the pin, letting it remain in until it sloughs off. If any swelling should take place foment it with hot water and apply acetate of lead, half an ounce; tincture of arnica, two ounces; water, one quart.

Salivary Fistula.—From accident an opening is made into the salivary duct and allows the saliva to run down the cheek, matting the hair as if glycerine had been rubbed on. Treatment.—Shave off the hair and put on strips of collodion or adhesive plaster three or four layers deep. Keep all solid food from the animal for at least twenty-four hours. Let the plaster remain on as long as it will, and if not stopped when it comes off, apply again. If this fails, rub on cantharides, two drams; lard,

one and a half ounces; protect the wound by putting on a little lard.

Ranula is a name given to a blocking up of the duct of the submaxillary gland, which opens at each side of the tongue. We usually find a swelling about the size of a hen's egg at each side of the tongue. Tumors have been described as abscesses or cysts; they are soft to the touch and may interfere with mastication Treatment.—Open them with the knife and bathe the mouth with alum, one dram; water, half a pint.

MUMPS (INFLAMMATION OF THE PAROTID GLAND).

This is seen in both horses and cattle and is caused by being confined in close stables that are over-heated. The animal is seized with symptoms of sore throat, considerable fever with cough and difficult breathing, and in some cases it may prevent the animal from swallowing. It may affect one or both sides. It may lead to suppuration if not attended to early. Treatment.—Foment the parts with hot water three times a day or apply a hot linseed meal poultice. After the inflammation has been subdued, if there is any hard swelling apply a mild blister of biniodide one part to twelve of vaseline.

Choking.—This is an accident which is of common occurrence in horses and cattle. A common cause in the horse is swallowing dry oats without chewing them. Some horses, when they are hungry, bolt their oats. I have also seen horses which have been kept on grass for a long time, bolt their

oats when getting their first feed. I have been called up on several occasions when a horse had been turned out to grass without getting any oats, and on getting a feed would swallow them. The result would be choking from the dry oats sticking in the gullet. The treatment is to give a little oil, then rub the hand up and down the gullet to scatter the accumulation. It may be necessary to give a little oil several times and continue the rubbing, as it may take some time to overcome the choking. In case that no oil is at hand I have relieved cases by pouring down some water. Anything that will moisten the oats will assist. In cases when the animal cannot be relieved by this treatment, cut down on the gullet with the knife, making an incision and removing the material. Clean the wound and bring the edges of the gullet together firmly with silk thread or catgut, letting the ends hang out of the external wound, then bring the edges of the skin together, then put a bandage around and keep it wet with cold water for twenty-four hours, and it will usually heal. Give the animal soft food. There are other causes of choking in the horse which are difficult to cure—foreign bodies, such as pieces of wood, a potato or piece of corn cob sticking in the throat. This form gives rise to very severe symptoms. The animal arches its neck and tries to vomit, the back is also arched and saliva flows from the mouth, and if the animal is not soon relieved, inflammation of the throat takes place and the animal dies from suffocation and exhaustion. It is necessary to put a twitch on the nose and a balling

iron in the mouth to keep it open. If you have not a balling iron, the iron stirrup of the saddle will answer. Put this in the mouth to keep it open, then pass the hand through it and into the throat and feel for the offending body and remove it, if possible. If it is a potato or piece of cob it may be removed by giving a little oil, then pressing on the outside of the throat it may be pressed up and the animal cough it out. The horse probang can be used with success in some cases.

Choking in Cattle.—This is usually caused by swallowing a potato, apple, piece of turnip or carrot or a piece of corn cob. No matter what part of the gullet it is lodged in, it causes great distress. The animal coughs, saliva runs from the mouth, eyes bulge out, back arched, and bloating also takes place. If it is in the upper part of the gullet the animal soon dies from suffocation. If it is in the middle or lower part the animal may live for several days. If it is in the upper part of the throat use the same means as for the horse. If it cannot be removed in this way, use the probang, which is made of spiral wire covered with leather, and will bend with the neck; there is also a gag to put in the mouth with a hole in the center through which the probang passes; oil the probang and let one man take hold of the animal's horns or ears while another passes the probang through a hole in the gag and back into the gullet. Press gently until you feel the object, then by steady pressure it will pass into the stomach; too much force should not be used in case of rupturing

the gullet. If this means fails, cut down, as directed above. No solid food should be given for a day after.

Rupture of the Gullet.—This is caused by accidents during the passage of the probang, also by pressing whip handles and broom sticks. No unyielding article should be pressed down the gullet, as it is almost sure to rupture it. I have known of a number of cases of death by parties using whip stocks with broom handles. If you have not a probang (which every stockman should have—they can be gotten at any of the instrument makers for three or four dollars) take a piece of rope about three-fourths to one inch in diameter, frizz out a little of the end and tie a piece of string around it to form a soft knob, grease this well and it will supply the place of a probang.

Rupture of the gullet is nearly always fatal. In some cases cutting down on the part and paring the edges of the wound and bringing them together as described, keeping down inflammation by cold-water bandages, and giving the animal gruel for food until it heals, is of use.

Inflammation of the Gullet.—This is usually caused from choking or the use of the probang, also from giving too irritant medicine, not sufficiently diluted. A case of this kind came under my notice. A horse was suffering from colic, and a dose of medicine was given which was not properly diluted, causing inflammation in the lower part of the gullet and part of the stomach. When I was called to see the horse it was suffering considerable pain,

with frequent attempts to vomit, and when the spasms were on, the animal suffered great distress. Pulse seventy per minute, respiration thirty per minute. From the history of the case, the animal could swallow all right at the beginning, and until it had had several doses of the medicine, and on the following morning when I was called in, the animal could not swallow. In pouring down a little water, the gullet was seen to fill up and cause the animal great distress. I considered it a case of inflammation of the gullet, and treated the animal by giving hypodermic injections of morphine, three grains at a dose, and the application of mustard to the lower part of the gullet. The horse died during the following night. Post-mortem examination revealed inflammation of the lower part of the gullet and left half of the stomach. The gullet was so swollen that I could not introduce my finger into it by using considerable force. Cases of this kind are not often met with. The treatment for inflammation of the gullet is as follows: For cattle, Epsom salts, one and a half pounds; ground ginger, half ounce; water, half gallon, to be given at one dose. For the horse, aloes, one ounce; carbonate of soda, half an ounce; ground ginger, half an ounce. Pour on half a pint of boiling water, then add one-half pint more of cold water, and give at one dose. The use of the physic in this case is to reduce the system, and thereby reduce inflammation. Follow this up with aconite, twenty to thirty drops in one-half pint of cold water, until the pulse is reduced in strength and number. To

relieve the pain, opium should be given in dram doses every three or four hours in a little gruel. Hot fomentations should be applied along the gullet, or mustard well rubbed in, the mustard to be made up with boiling water.

CHAPTER II.

STOMACH OF THE HORSE.

The stomach of the horse is very small for the size of its body, and usually empties itself in from four to five hours. After this, if the horse is not fed, it weakens very fast. The stomach is divided into two parts: the left half, which is lined with a prolongation of the lining of the gullet, and which does not secrete any gastric juice; the right half, which is lined with a velvety coat, which secretes the solvent juice. The former part is where the bots inhabit, as the exudation of the gastric juice, in the right half, would interfere with their comfort.

Life History of the Bot.—The bot fly deposits its nits or eggs on the horse's legs, sides, flanks and under the chin. In a few days the eggs are hatched and the larva makes its way down the hair to the skin, which it irritates, causing the horse to bite or lick the part. In this way the young creature gets into the horse's mouth and down to the stomach, and when they reach the left portion, adhere to it by two small hooks; they have no mouth, and are fed by some of the digested food being absorbed through their skin. In this way they grow until the following spring, when they release their

hold and pass out of the stomach into the intestines and are carried out with the contents of the bowel. They usually lie quiet for an hour or so, then will crawl into some safe place, where they remain in the form of a chrysalis, the skin becoming shell-like. The further change in the chrysalis takes place about the eighteenth or nineteenth day, when the shell bursts and the fly comes out strong in wing and limb. The question is often asked, do bots do any harm to the horse? Veterinary surgeons are agreed on this, that they do not, unless they are over-crowded and pushed to other parts of the stomach or intestines, where they may interfere with digestion. There are very few cases reported where the bot was the direct cause of death. The idea that bots eat the stomach is a mistake. As they have no mouths, this cannot be possible. I have been told by farmers that have opened a horse which had died from acute indigestion or inflammation, that they found on opening the stomach that the red lining had been eaten off the left half of the stomach by the bots. If they had known that the left half had no red lining they would not have charged the bots with eating it. There is no medicine that will kill bots that can be given to the horse without destroying the stomach.

Impaction of the Stomach in the Horse.—This is a very common and very fatal derangement caused by the animal eating too much food; the result is distention of the stomach, preventing it from contracting on its contents. The food swells and fer-

mentation takes place, causing rupture of the walls of the stomach, or the animal may die from exhaustion and suffocation, or from brain affection. In order to prevent this the horse should be fed at regular periods, at least five hours apart. A common cause of this is a horse getting loose during the night and going to the oat or corn bin and gorging itself. I have known a great many deaths from this cause. The oats or corn should not be kept where a horse can get at them if it should chance to rub off its halter or get loose during the night. A common cause of this is giving the horse a large feed because it is going to do a hard day's work or a long journey. When the horse comes in from a hard day's work or a long journey it should first have a little hay to eat, then water and then grain. If it gets its grain first, while hungry and the stomach weak, it bolts it down and the stomach is not able to digest it, and the above result takes place, but when a little hay is first given, the animal eats it more slowly and the stomach gains a little strength, thus preventing colic.

Treatment for Indigestion: Give aloes, one ounce; carbonate of soda, one-half ounce; ground ginger, one-half ounce; dissolve this in half a pint of boiling water, then add half a pint more of cold water. To stimulate the stomach give half a pint of good whiskey in a little water or one dram of nux vomica rubbed up in hot water; repeat this dose every three hours. If it is suffering much pain, give it two drams fluid extract of belladonna every three hours, or four

drams of chloride chloral hydrate dissolved in a pint of water, every three or four hours. If the physic does not operate in twenty-four hours, repeat the dose. If the horse will drink water, give it, as it may wash some of the contents out and thus relieve, experience proves that it is good practice to do so.

Dilatation of the Stomach Due to Bad Management in Horses.—If a horse is fed on bulky food given in great quantities, at all times, without regular intervals, distention of the stomach takes place, which weakens its walls, preventing it from performing its functions of digesting the food, resulting in dyspepsia or colic. In order to prevent this, feed the horse at regular intervals and in small quantities: fourteen pounds of good hay and ten pounds of oats is sufficient for a horse in the twenty-four hours, whether used as a driving horse or for doing an ordinary day's work. When a horse is overworked, it requires more food, but this is done at the expense of the animal's health. I have taken notice in the spring of the year, when the farm horse has to work long hours and is fed six to ten quarts of oats at a feed, that I have been called to a great many cases of colic. It is poor economy to overwork and overfeed the horse.

CRIB-BITERS AND WIND-SUCKERS.

This is a habit with some animals, and in others it is caused by a deranged condition of the digestive organs. A crib-biter seizes the manger or anything it can get hold of with its teeth, arches

its neck, and makes a sound as if it was sucking air. A chronic crib-biter can be easily known by its incisor teeth being worn.

A wind-sucker extends its head or presses it against something solid, gathers its feet together, arches its neck and back, and draws in wind until its abdomen is greatly distended. Wind-sucking is the worst of the two evils. To prevent this it is best to put a muzzle on the horse when not feeding. Straps with sharp nails in them, which some use, can be bought at the harnessmaker's; but I do not recommend them. In the early stage of the disorder it is best combatted by giving the horse a physic, having a piece of rock salt in its manger, feeding on good food, and giving it regular work.

DYSPEPSIA.

The Causes of Dyspepsia in Horses and Cattle.—Giving too much food at rare intervals, or starving an animal for some time, and then allowing coarse food in large quantities or indigestible foods. I have seen a great many cases of this kind, especially in the poor man's horse. When a horse is fed oats on an empty stomach, it usually eats hurriedly, cramming its stomach with imperfectly masticated oats. To prevent this, give the horse a small quantity of hay first, then water, and then oats. A horse should be allowed half an hour after being fed before put to fast work, as this is a cause of dyspepsia.

Symptoms.—Staring coat, dullness at work, emaciation, with tucked-up belly, frequent dis-

charges of foul-smelling gas, constipation or looseness, and the presence of half masticated or indigested food in the dung, and they are often troubled with belly-aches, and worms may be passed. In cattle, especially in the cow, do we find cases of dyspepsia. The appetite is impaired, and there is a desire to pick up and swallow dirt, sand, lime, etc. The milk is scanty and of poor quality, and the animal becomes thin, dry-haired and lousy. There may be either diarrhea or constipation. In some cases the animal does not chew its cud, and there is more or less fever indicated by a dry nose.

Treatment.—Regulate the diet. Give a dose of raw linseed oil, from one and one-half pints to one quart at a dose for the horse. For the cow, one pound of Epsom salts and one ounce of ground ginger, dissolved in half a gallon of cold water and given at one dose. After the physic has operated, both in the horse and cow, boil a teacup of linseed into a pulp with a gallon or two of water, and while hot, pour it over half a pail of bran and make a mash of it, and when cool, put in one of the following powders: Sulphate of iron, four ounces; nitrate of potass., four ounces; divided into twenty-four doses. Give daily, and continue for several weeks if necessary. If the animals are lousy, see chapter on lice.

GASTRITIS (INFLAMATION OF THE STOMACH).

This is not a common disease, either of horses or cattle, and when it does occur, it is usually caused

by too irritating substances, such as giving strong medicines, without having sufficient water or oil to dilute them. Also from poisons. Symptoms. —They consist of nausea, and vomiting, in the animals that can vomit; they are speedily followed by violent colic. The horse looks around at its sides, and will not stand quiet for a moment, paws with its fore feet, crouches, lies down, and rolls, gets up, and goes through the same thing. When he turns his nose around it is always to the side behind the shoulder. The pulse is quick, and although strong at first, it soon becomes weak and fast, from eighty to one hundred per minute. The ears and legs are cold, and cold sweat may break out all over the body. As the disease advances the pulse becomes very irregular and the animal appears stupid; the pupils of the eyes are dilated, and the animal may become paralyzed or may die with convulsive fits, suffering intense pain, through the whole course of the disease. Treatment.—It is necessary to find out the cause. If it is from giving ammonia in too concentrated a form, give vinegar. If from turpentine, give opium and oil. If from any of the potassiums, give oil. In all cases give powdered opium in one to two dram doses every two hours until relieved or death ends the same. If the animal recovers, it will be necessary to feed it on soft, easily digested food, such as boiled flaxseed and ground oats in small quantities for a week. Give all the cold water it will drink.

THE STOMACHS OF THE OX.

The first stomach is called the rumen; it lies on the left side and occupies about three-fourths of the abdominal cavity. It is made up of three coats. The external one is composed of two sets of strong muscular tissue, one set longitudinal and the other set circular. Besides these there are two strong bands of elastic tissue, one running lengthwise and the other across. The part of the inside of the stomach where these bands are is smooth and white. The use of these bands is to strengthen and assist in the contraction of the organ. The use of the muscular coat having its fibres running in the two directions is to contract the stomach both in its length and breadth. The inside coat or lining is rough, although soft to the touch, and has a few glands scattered over it, secreting a small quantity of mucous, which assists in softening the food.

USE OF THIS STOMACH.

Cattle collect their food in haste, only partially breaking it down by a few strokes of the molar teeth, and store it in the rumen for some time to soften and undergo chemical process by the saliva acting on it. It is then forced up the gullet in small billets by the contracting action of its walls, to be rechewed or become what is called the cud. It is then thoroughly masticated and mixed with the saliva and passes down the gullet to the third stomach. This goes on until the rumen is

nearly empty. Anything which deranges this stomach seriously interferes with digestion and the health of the animal.

The second stomach is a small honey-comb bag situated at the anterior part of the rumen. Its use is not well understood.

The third stomach, called the omasum or manyplies, lies on the right side of the rumen, to which it is attached. It is small and divided by twelve leaves, which pass right through from end to end. There are also a number of short ones which are attached to the others on one edge. There are about sixty in all. These leaves or manyplies are lined with a thin membrane, which secretes a fluid which assists in digestion. After the death of the animal this coat often adheres to the food between the leaves. The food in this stomach is usually dry, or partially so, and it is supposed that the liquid portion is squeezed on into the fourth stomach, and that some of the dry, indigestible portion drops back into the rumen to go through the softening process and be recudded. This stomach is capable of considerable distention, which is often the case by the accumulating of indigestible, innutritious food, which may cause paralysis of its walls.

The fourth stomach is the true digestive one and is called abomasum, or rennet. This stomach is seldom deranged. More cattle die from derangement of the first and third stomachs than all other diseases to which cattle are heir.

DISEASES OF THE FIRST STOMACH IN CATTLE.

Tympanitis Hoven, or Swelling With Gas.—Causes of this disorder are numerous, eating damp grass, the soft, succulent grass of early spring, and the second crop of clover in the autumn when it is wet with dew or rain. Sometimes a change of food, such as a small quantity of ground oats, peas or corn, will cause severe bloating. It is also caused from over-filling of the paunch with indigestible food of any kind, and this is the most troublesome to get rid of. This disorder often takes place from disease of other parts of the body, such as impaction of the third stomach or constipation of the bowels. Symptoms: During the time the animal is eating, or shortly after, a swelling appears on the left side, and as it increases the animal appears to be in distress, pants, strikes its belly with its hind foot, eructations of gas are noticed; the animal does not chew its cud. As the trouble goes on the breathing becomes more difficult; the animal moans, the back is arched, the eyes are protruded, the tongue hangs out, saliva dribbles from the mouth. At this stage of the disease, if the animal is not relieved, it will die from suffocation, the contents of the abdomen pressing against the lungs in such a way that the animal cannot breathe: Treatment: When any signs of swelling take place the animal should be prevented from eating any more. If no medicine is at hand, cold water should be thrown over the back and loins. This sometimes causes the rumen to

contract, expelling the gas. A handful of common salt dissolved in a quart of water is also useful. Aromatic spirits of ammonia in two ounce doses in a pint of cold water and repeated in half an hour is the best remedy. The liquor ammonia in two ounce doses put into one quart of cold water

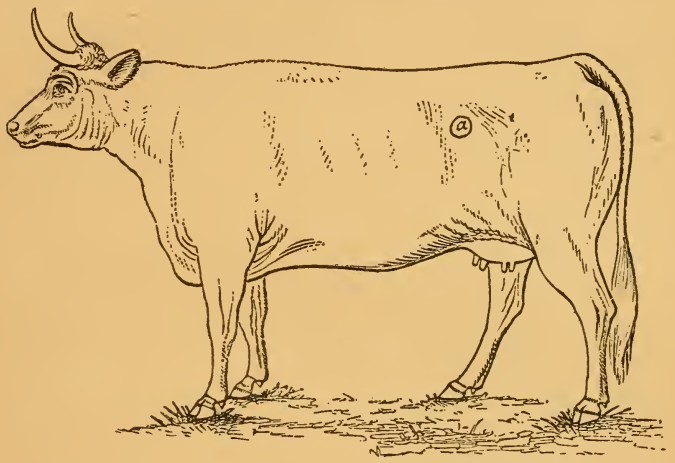

PLATE 1. THE SEAT OF PUNCTURE OF THE RUMEN. (a)

or carbonate of ammonia given in half ounce doses dissolved in a quart of cold water, and repeated in half an hour if necessary, is useful. If time will allow, one and one-half pounds of Epsom salts dissolved in half a gallon of water and given at one dose is a good remedy. In cases when time will not admit of treatment, tapping should be resorted to at once. (Plate 1.) This is a simple operation. Take the highest part about a hand's breadth in front of the hip bone on the left side, and about

the same distance from the short ribs. It is not particular for an inch or so. When the animal is greatly distended plunge the knife in and make a hole large enough to admit the finger, which should be put into the opening as soon as the knife is withdrawn, and the gas will rush out at the side of the finger. It is necessary to do this because when some of the gas comes out, the opening in the skin will not be opposite to the opening in the paunch and the gas will not escape. The best instrument is the trocar and canula, which every stockman should have. In using this instrument, the skin should be cut with a knife, then the trocar and canula pressed into the rumen, then the trocar is drawn out, leaving the canula in, when the gas will escape through it. If it is necessary to use it a second time in the same animal a new opening ought to be made. No after treatment of the wound is necessary.

CHRONIC HOVEN (TYMPANITIS).

Some cows are predisposed to indigestion, resulting in the formation of gas in the rumen, and although not severe enough to call for tapping, interferes with the animal's comfort and health. Symptoms.—The animal is generally distended with gas soon after eating; the cow grunts and does not chew its cud; the hair becomes dry and stands on end, and by degrees it becomes thin; and, if giving milk, it is soon reduced in quality and quantity. The bowels may be constipated or a form of diarrhoea may set in. Treatment: Regu-

late the diet. Give good, nutritious food in small quantities and often. It may be necessary to give a dose of Epsom salts one to one and one-half pounds and one ounce ground ginger dissolved in one-half gallon of cold water. This to be followed by sulphate of iron four ounces, nux vomica two ounces, divided into twenty-four doses, one to be given morning and night in bran mash. Boiled flaxseed is also good.

IMPACTION OF THE RUMEN.

Causes.—Some kinds of food are more liable to produce this disorder than others, grain of any kind in too large quantities, chaff, potatoes, and coarse grass. When the quantity is too great it causes distention of the rumen so that its walls become paralyzed. Symptoms.—The animal appears dull and suffers more or less pain. The left side is swollen, and when pressed by the hand has a doughy feel and pits on pressure, and when the animal lies down it does so on its right side. The breathing is increased and the pulse is small and may number sixty to eighty per minute. The animal grinds its teeth, the nose is dry and the back is arched. Fermentation may set in, causing greater distention, which aggravates the above symptoms. Inflammation may set in and, in addition to the above, the animal will manifest pain when the left side is pressed. Treatment.—Remove some of the impacted food, or if gas is formed remove it. The probang must be pressed down to

allow the escape of gas or the trocar and canula used as for tympanitis. Cases have been cured by throwing cold water over the back and loins. If the distention is not too great, give a dose of Epsom salts and ginger; pressing and rubbing the rumen is sometimes successful, but if these methods fail it will be necessary before the animal is exhausted or the brain becomes congested to make a large opening in the rumen and remove a part of the contents with the hand. Place the animal with its right side against a wall and let an assistant hold it by the nose, at a point midway between the last rib and haunch bone and about a span from the backbone.

Make an opening from this point downward large enough to admit the hand; the edges of the wound should be stitched together to prevent food getting in between the skin and the walls of the rumen; then with the hand remove the greater part of the mass. It is best to leave a little to stimulate it. Then stitch up the walls of the rumen, first with carbolized catgut, care being taken that the edges are inverted. The wound of the muscles and skin then being stitched up, cold water dressing should be applied and the animal given stimulants. Tincture of ginger one ounce, tincture of gentian one ounce, tincture of iron one ounce, mix and give in a quart of oatmeal gruel. Give two such doses daily until the animal is well. I have operated on three cows with success; one from an overdose of cabbage leaves, one from rye

and the other from corn. In the last case I removed two bushels of corn and left about one in the rumen.

There is very often an accumulation of various kinds found in the second stomach of cattle, such as hair balls, from licking each other, needles, pins, knives, nails, etc. Nothing can be done to remove these; in fact it is only after death that they are found.

Impaction of the Third Stomach (sometimes called Dry Murrain).—The third stomach of cattle is composed of a number of leaves, some sixty in number; between these leaves food passes on to the fourth stomach, which is the true digestive one, and what is meant by impaction is dry, indigestible grasses or other foods which lodge between the leaves, causing either stoppage or inflammation, and very often causing death, as it seems to be very difficult to get medicine to act on this stomach. In the fall and spring this disease is most common, caused by the animal eating the tough frozen grasses, over-ripe hay, and bed straw. I have seen this disease destroy calves which were fed on timothy hay with no soft food and little exercise. Symptoms: The animal refuses food, if the cow is giving milk it will be partly or wholly arrested, the animal does not chew its cud, the nose is dry, and, if made to move, it will moan or grunt; the bowels at first are constipated, what is passed will be dry, hard and glazed; the back is arched and the left side may be somewhat swollen. As the disease advances the eyes stare and are par-

tially insensible to light, and the muscles tremble; or the animal may stagger, the grunt is now constant, the pulse, which was not much affected at first, is now rapid and weak, eighty to one hundred per minute. In some cases the brain becomes affected in the early stage and the animal becomes frantic and runs wildly about; the vision seems to be impaired or there is total blindness, as the animal will stumble over anything that comes in its way, dashing its head against trees, fences, or human beings. I have seen some animals tearing up the ground with their horns and bellowing in a violent manner. Some cases are affected with stupor, staggering gait, or even partial paralysis. The nature of this derangement is not an inflammation of the brain, but a sympathetic delirium caused from an over-distended stomach. This disease is what is called "mad itch." It seems to be more prevalent some years than others, and was thought to be caused by eating corn stalks; but we find it in animals that never had any. The urine is sometimes mixed with blood. If the animal is not relieved it may die in a few days or live for two weeks. Very often a foetid diarrhoea sets in before death. Treatment: Give one quart of raw linseed oil with two drams of fluid extract of belladonna in it at a dose; follow this with one pound of Epsom salts, one and a half drams of quinine, dissolved in half a gallon of cold water and given at one dose. If the animal is in great distress, give one dram of belladonna fluid extract in half a pint of raw linseed oil every four hours. If

the physic does not operate in twenty-four hours, repeat the salts and quinine. Injections of soap and warm water are useful. Aloes in one ounce doses mixed with one pound of Epsom salts have been found useful, also thirty to forty drops of croton oil given in a little linseed oil, but I have had most success with the former. The animal should be given all the cold water it can drink. As soon as the animal is noticed ailing, it should be treated. If this disease is allowed to go on for a few days, medicine is of very little use, as the secretions are arrested.

Inflammation of the fourth stomach (abomasum) is not common in cattle. It is caused by poisons or some irritating substance the animal has eaten. The symptoms are so much like impaction of the third stomach that it is difficult to tell the one from the other. The cases of inflammation of the fourth stomach which I have seen show more signs of pain and very full, fast pulse, and more acute fever. (Youatt mentions a curious stretching out of the fore limbs with the brisket almost to the ground.) Post-mortem: Lesions comprise congestion, redness, with flakes of mucous, and sometimes blood, mixed with the contents of the stomach. A portion of the small intestines is usually involved. Treatment: Remove the cause if possible. If from poison, give an antidote; for instance, if the poison is an alkali, give an acid, and if an acid give an alkali; to reduce the inflammation, give linseed

tea and dram doses of opium every two hours. If the animal is in a weak condition, give aromatic spirits of ammonia, two ounces at a dose in a pint of cold water. Aconite, in doses of thirty drops combined with the opium is also useful. Give all the cold water the animal will drink.

Cattle sometimes suffer from indigestion, that is, the stomach or stomachs get into a weakened or deranged state; the animal may not be actually sick, but it is in an unthrifty condition, the milk is of poor quality, and little of it. When the cow gets into this condition, all the secretions are more or less arrested, and with them the secretions of milk. I have seen a number of cases of this kind. Symptoms: The animal may eat its food at times, and at others it will eat only part of it. The hair becomes dry, and the back arched a little, and the skin is tight on the ribs, the eyes become sunken, and the animal will grind its teeth, and seem to be in pain at times. The bowels are usually constipated, and in some cases there is diarrhoea. There is very little fever. An animal found in this condition, with the absence of other diseases, may be safely said to have indigestion. Treatment: Give at one dose, from one to one and one-half pounds Epsom salts, one ounce ground ginger, dissolved in half a gallon of cold water, and follow this by giving a teacupful of linseed, boiled into a pulp, with two gallons of water, and, while hot, pour into half a pail of bran and make a mash of it. Give a mash of this kind once a day,

and continue it for a few weeks. Also, give one ounce tincture of ginger, one ounce tincture of gentian, and one ounce tincture of iron, in a pint of water, twice daily.

CHAPTER III.

INTESTINES.

The intestines of the horse are some ninety feet in length, seventy feet of small intestines, and twenty feet of large. The intestines of the horse are very vascular, that is, they are largely supplied with blood and nerves, much more so than in the ox, and, I think, this accounts to a certain extent for the frequent attacks of colic and inflammation of the bowels in this animal, as compared with the ox. The large intestines are very much contracted in several places, and it is on this account that we have so often impaction. The dilated part gets so filled up with indigestible food that it cannot pass through the contracted parts, setting up inflammation and often causing death.

COLIC.

There is no more frequent and fatal disease in the horse than that known as colic It takes on three forms—spasmodic colic, flatulent colic, and dyspeptic colic.

Spasmodic Colic.—The causes are many. Irregular feeding and overwork, thus a horse gets an overfeed in order to make it stand a long drive or a hard day's work. The hard work takes the blood

from the stomach and intestines, and as a result, digestion is interfered with, the mass undergoes fermentation, causing pain or cramps. Overfeeding loads the intestines, often resulting in spasms. A change of food, as changing from old hay to new, or from old oats to new and also green food, large quantities of cold water on an exhausted stomach, exposure to cold, anything which irritates the nerves of the intestines, will sometimes cause spasms, thus we often have spasmodic colic without any apparent cause. Symptoms: The horse paws with his fore feet, crouches, shifts about, looks around at its side, lies down, rolls on his back, gets up and shakes himself, stands quiet for a few seconds or minutes, then goes through the same performance. When the cramps are very severe he will throw himself down, no matter where he may be, sweat breaks out over the body, the breathing becomes fast and heavy, the eyes are prominent and staring, there is an expression of anguish; there is a pause for a few minutes, but the symptoms soon return and are often aggravated, but by degrees the attacks are fewer and farther between, and the animal recovers. In other cases the pulse, which was at first not much affected, now becomes fast and weak, from eighty to one hundred; the brain becomes deranged and it tosses to and fro, the belly becomes tense, the legs cold, and a cold sweat breaks out, the legs tremble, the lips are retracted, and the horse dies. The principal symptoms which denote that it is spasmodic colic are the intervals of relief from pain. Treatment.—

First: Give two ounces of tincture of opium, two ounces spirits of nitric ether, in half a pint of cold water at a dose; repeat in half an hour if not improved. Second: Sulphuric ether, two ounces; tincture of opium, two ounces; water, half a pint; repeat every half hour until improved. Third: Tincture of asafetida, two ounces; aromatic spirits of ammonia, one ounce; water, half pint. Fourth: Chloroform, one-half to one ounce, given in one-half pint of oil; repeat in half an hour. If none of these are obtainable, give two tablespoonfuls of ground ginger or carbonate of soda in a pint of hot water. Injections of soap and warm water are very useful. The animal should have a place where it can roll about and some one to watch it, but should never be driven, as I have known cases that have died from being driven while having colic. Horses that are subject to colic should be fed sparingly on easily digested food, and at least one hour should elapse before put to work after feeding.

Flatulent Colic—Bloating.—The causes are similar to those causing spasmodic colic. Large quantities of food when the animal is in an exhausted state, especially a large quantity of green grass, when the animal is not accustomed to it. In making this change it should be very gradual. Horses that are subject to indigestion are liable to wind-colic, from the indigested food undergoing fermentation, producing gas. Symptoms of Flatulent Colic: The horse is dull, paws with his fore feet, is restless, but at first may not lie down; the sides are distended, and when struck by the hand, a drum-

like sound is heard. As the distention increases, the horse looks around at its flanks, lies down, rolls, gets up and down again; there is no easy spell as in spasmodic colic. If not relieved, the distention becomes so great that it presses against the lungs, and causes great difficulty in breathing, and the animal may die of suffocation in a few minutes, or from rupture of the gut. Treatment: The best remedy is aromatic spirits of ammonia, in two-ounce doses in a pint of cold water, and repeated in half an hour. Clean out the bowels by injections of soap and water, then inject two ounces of spirits of turpentine mixed in half a pint of linseed or any other oil. If oil is not obtainable, mix the turpentine in a pint of milk. Repeat the injection of turpentine and oil every twenty minutes until the animal is relieved. If ammonia is not on hand, give baking soda, two to three tablespoonfuls, and ground ginger, two tablespoonfuls, in a quart of hot water. From one-half pint to one pint of whiskey can be given in half a pint of hot water. Tincture of asafetida in two-ounce doses in half a pint of water is useful Also injections of from two to four ounces tincture of asafetida mixed in milk are very good. Also give a quart of raw linseed oil as a physic. In severe cases the bowel should be punctured in the most prominent part. Plate 2. The instrument is a small trocar and canula. The skin is cut with a knife, then the trocar and canula are pushed into the bowel in a direction inward and downward. The trocar is pulled out and the gas will escape through the canula. There is little

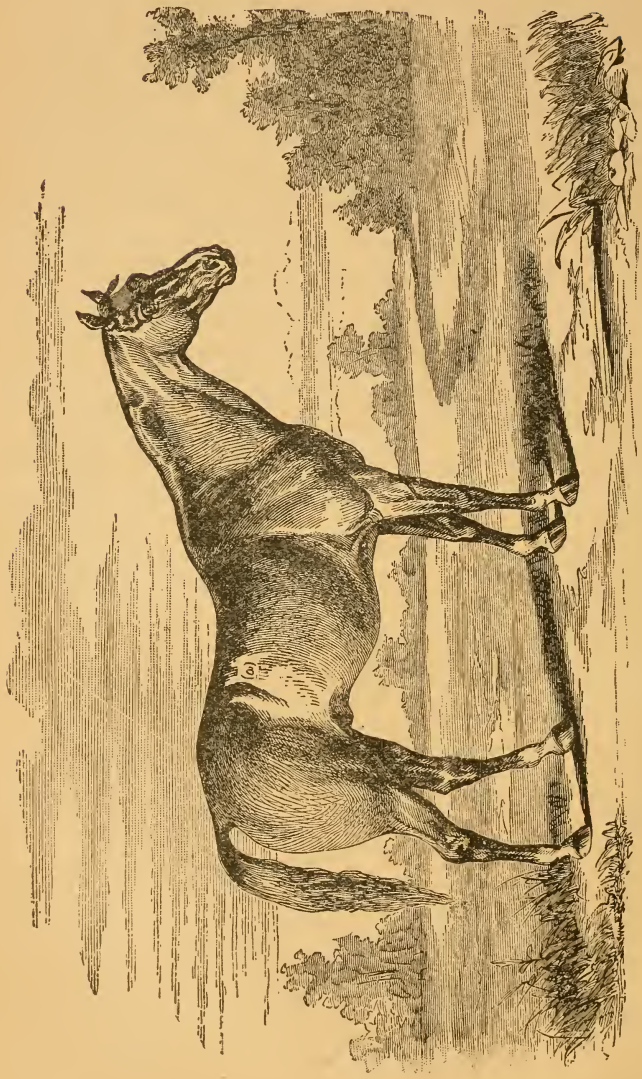

PLATE 2. SEAT OF PUNCTURE OF THE COLON. (a)

danger in this operation, only it should be done before the animal is too far gone. The right side is preferred to the left, as we reach the colon easier on the right side.

IMPACTION OF THE LARGE INTESTINES.

This derangement is most common in the fall and spring, but is frequently seen at other times. It is usually caused by horses and colts eating dry, indigestible grasses in the autumn and spring months, and from eating old, dry, hard hay, when largely fed on it; deficient secretions in the large intestines, and not sufficient water. The indigestible mass may not dry, still from being packed together it cannot pass on through the contracted portion, and as a result, it sets up irritation and inflammation, and if not relieved the animal dies. Symptoms of Impaction: The pain is slight at first, the horse shows signs of belly-ache, but it may soon pass off, to return in a few hours; the feces are passed frequently at first, but soon none is passed. The abdomen is full, but not with gas. After a time the pain becomes more severe, the horse paws, looks around at its flank, lies down on its side with its legs outstretched, and may lie in this position quietly for ten or fifteen minutes, get up and lie down in the same way. It seems to be fairly easy in this position. This may continue for a day or two, but inflammation soon sets in; then the pain becomes continuous, the animal breathes fast, and the pulse, which was not much affected in the early stage, now becomes fast and it may be weak, and

the animal dies. Treatment: Give aloes, one ounce; carbonate of soda, one ounce; ground ginger, one ounce; powdered nux vomica, one dram. Dissolve this in half a pint of boiling water, then add half a pint more of cold water, and give at one dose; or give one quart of raw linseed oil, ten drops of croton oil, and one dram of nux vomica at a dose. If there is much pain, give from one to two drams of the fluid extract of belladonna, in half a pint of raw linseed oil, every two hours. If the physic does not operate in fifteen or twenty-four hours, repeat the dose. The action of the physic may be assisted by giving injections of soap and water every half hour at first, and if no action, give injections of two ounces of turpentine in half a pint of oil every hour. Allow the horse as much chilled water as it will drink. Kneading the belly and walking exercise are useful before the pain is severe; after that, keep the animal as quiet as possible. If the physic and other treatment are begun early, the animal usually recovers. I have made examinations of animals which have died from impaction, and found three and four feet of the colon impacted with a mass of tough, half-masticated grass, which no medicine could remove. Constipation may occur in animals which are fed for a long time dry, innutritious food, and a dry condition of the bowels. If the case is not severe, change of diet, such as bran mash and boiled flaxseed, is all that is required, but if there is colic, give from a pint to a quart of raw linseed oil, with

from one to two drams of the fluid extract of belladonna in it. Injections of warm water and soap are very useful. Give the animal regular exercise. Constipation in foals will be treated in the chapter, "How to Take Care of the Foal."

Indigestible colic is caused by eating straw and corn stalks; pea straw is notorious for causing it, also bad teeth and want of sufficient water and exercise. Symptoms: The horse shows signs of colicky pains by pawing with its fore foot; it will lie down and keep down for hours, as it seems to be easy in this posture. If the animal is made to rise, it will go to the manger and begin to eat, and may continue doing so for some time, occasionally looking around its side, switching its tail, and kicking with one hind leg. Sooner or later it lies down and remains down for some time, unless made to rise. The breathing and the pulse remain normal. The horse may remain in this condition for several days, and may get well; or it may become a very severe case of colic. Treatment: Give aloes, one ounce; soda carbonate, one ounce; ground ginger, one ounce. Dissolve this in half a pint of boiling water, then add half a pint more of cold water, and give at one dose. One to two drams of the fluid extract of belladonna can be given instead of the aloes. Injections of soap and water should be given several times daily until the physic operates. Feed good hay and oats in small quantities and give regular exercise.

Intestinal Concretions.—There are concretions sometimes found in the stomach and large intes-

tines of horses and cattle, composed mostly of vegetable and mineral matter, and hair balls. The symptoms of these are those of colic and constipation, and are only found on post-mortem examinations. The treatment is the same as for constipation.

Intussusception, or invagination, is the slipping of one portion of the intestine into another. This occurs most often in the small gut. There are no symptoms by which we can be sure that such a thing exists, as the symptoms are those of severe colic or inflammation of the bowels.

Volvulus, or gut-tie, or twisting of the bowels, is an accident which happens to horses from violent straining, and is sometimes caused by spasmodic colic. It is only after death, when an examination is made, that we discover the twist. The symptoms are those of severe colic, and medicine does not relieve the animal's suffering. From that we conclude that some lesion of the bowels has taken place.

ENTERITIS (INFLAMMATION OF THE BOWELS).

This disease may affect the mucous membrane, or the walls of the bowels may be all involved. The cause of inflammation of the bowels is often obscure, although I have seen a number of cases of true enteritis, where a large portion of both large and small intestines were affected, and could find no cause. Irritating medicine and poisons will produce it. Obstructions in the bowels will also cause a portion of them to become inflamed. It is said that

spasmodic colic will sometimes terminate in inflammation, from giving cold water when the animal is hot and exhausted, or from feeding musty hay and oats or any kind of bad food. Symptoms: It usually comes on gradually. I have known cases in which the horse was only thought to be off for a few days, and no bad result suspected. If the animal is examined carefully from the beginning, it will be found that both the pulse and the temperature will be increased, which is not the case in colic. The membrane of the mouth and nose are congested, and are of a dark red color, the mouth is hot and dry and the breathing is increased, the colicky pains are continuous, the animal walks around or lies down very carefully, turns on his back against the side of the stall, and remains in this position for a few minutes, but will not be still, as it will keep its head on the move and there is an expression of anguish. As the disease goes on, the pulse becomes very fast, eighty to one hundred per minute; temperature one hundred and five to one hundred and six. The animal pants and moans, and sweat breaks out all over the body. The animal is continually on the move, not a moment of relief. The bowels may be constipated or diarrhoea may be present. After a while the walls of the belly become tucked up, and hard and tender to the touch, the back is arched, the ears lopped and cold, champing of the jaws from pain. The animal now walks around its stall stiffly, may stagger or may stand and tremble violently and then fall to the ground and die with a few convulsive strug-

gles. Fever and a continual pain, with great restlessness and an anxious expression from beginning to end, will enable us to form a correct opinion between inflammation of the bowels and spasmodic colic. Treatment: Give powdered opium, two drams; tincture of aconite root, twenty to thirty drops, every two or three hours in a little gruel. Calomel in one dram doses twice a day is useful. Injections of simple hot water may be tried, but if it increases the pain, it should not be persevered with. Blankets wrung out of boiling water and applied to the sides are useful, if well done; but on account of the restlessness of the animal this cannot be done with satisfaction. Mustard applied to the belly is better.

Diarrhoea is caused by animals eating mushy food and grasses on low, marshy lands, too much green food when the animal is not used to it, driving after eating a large quantity of soft food, drinking bad water, and from a deranged condition of some other organs of the body. Diarrhoea is often an effort to rid the system of some deleterious substance from the body. Symptoms: The frequent evacuations of liquid faeces. In some cases there is pain and in others it is absent. If it is continuous for some time, there will be loss of appetite and emaciation. The discharge varies very much; sometimes the animal will pass enormous quantities of very liquid faeces; and in a case of this kind, it requires to be stopped as soon as possible or it will soon exhaust the animal by removing too much liquid from the system. On

the other hand, if it is not severe, more time can be given. Treatment: Find the cause, if possible. If it is from faulty food or water, change these and little more is needed. If from a change of food or indigestible food, give one and one-half pints to one quart of raw linseed oil and two drams of the fluid extract of belladonna in it at one dose. After this has operated, if it does not stop, give one dram powdered opium, one dram camphor, made into a ball. Repeat in four hours if necessary. Or give powdered opium one dram, powdered catechu two drams, made into a ball or put in a quart of starch gruel; or give one dram opium and a tablespoonful of chalk in starch gruel. Sometimes ginger, gentian, and chalk, a tablespoonful of each, given in a quart of starch gruel, every three hours, will stop it. If the discharge is of the severe kind and very watery, give two drams of powdered opium and one dram of acetate of lead in a ball or in starch gruel, and repeat every two hours until it stops; feed on good oats and hay, in small quantities for a few days. This treatment is for cattle as well as horses.

Dysentery may be of two kinds; what is called bloody flux, when there is considerable blood mixed with the faeces. This form is accompanied by ulceration and is the most dangerous. The other form is a discharge of mucous with the faeces, accompanied by great straining. Causes: Inflammation of the mucous membrane of the bowels often resulting in dysentery, especially in cattle; exposure to cold, coarse, innutri-

tious food and debilitating influences, which act slowly; such as scrofula and other blood diseases. Symptoms: It may be acute or chronic. In the acute cases there is fever, with slight abdominal pains. The animal stands with arched back, straining and passing small quantities of thin faeces, tinged with blood or mucous. In some cases strings or shreds of the mucous lining of the bowels may be passed, several inches in length. I remember being called to a case of this kind in a horse in which the owner thought the horse was passing partly decayed worms, which he considered were the cause of the horse's ailment, but which I found to be strings of the mucous membrane. As the disease advances the patient becomes emaciated, the pulse is fast and weak, the temperature rises, the appetite may in some cases remain fair, but usually it is impaired. The animal becomes hide-bound, and often the legs will swell. There is a very foul smell, and if ulceration has set in there will be considerable blood of a dark or nearly black color. The eyes become sunken, the rectum is protruded and red and sore, and if the animal is not soon relieved will die from exhaustion, although an animal may live in this condition for several weeks. Treatment is considered very unsatisfactory, although if attended to at once, I have had good results. First give at one dose a pint and one-half of raw linseed oil and tincture of opium two ounces; follow this up with turpentine one ounce, tincture of chloride of iron one ounce, boiled flaxseed one quart; mix and give

at one dose. Give a dose of this kind three times a day. Clean out the bowels with warm water injections, then inject the following three times a day: Acetate of lead two drams, carbolic acid half a dram, tincture of opium one ounce; mix this in a pint of thin starch gruel. If this treatment does not relieve the animal in two or three days, give the following three times a day: Tincture of gentian one ounce, tincture of ginger one ounce, tincture of chloride of iron one ounce; mixed in a quart of starch gruel. Ounce doses of bismuth nitrate in a quart of starch gruel have been given with good results two or three times daily. A teacupful of flaxseed boiled into a pulp and mixed with a little ground oats is good; also plenty of pure water. If the animal is chilly clothe the body and hand-rub the legs and put on bandages. The treatment could be greatly assisted by good nursing and placing the animal in a good, comfortable stable and feeding it on good oats and hay.

Superpurgation is caused by an overdose of physic, or a dose of physic given when an animal is in a weakened condition, either from disease or from exhaustion. Although a horse may purge severely, as long as it eats well and the pulse keeps near the natural point treatment is unnecessary, but if it stops eating and the pulse becomes rapid and weak, the breathing fast with colicky pains, and cold legs there is great danger of the animal dying from inflammation or collapse. Give from one to two drams of powdered opium every two hours, and if the legs and ears are

cold, and the pulse very small, a stimulant will be necessary. Two ounces sweet spirits of nitrous ether and one ounce of aromatic spirits of ammonia in a pint of cold water and repeat in one hour if necessary, or half a pint of good whisky in water. Clothe the body and hand-rub the legs and bandage them. If the pain is severe, rub mustard made up with hot water on the belly. When the appetite returns, give boiled flaxseed and ground oats for a few days, and very little hay.

Haemorrhoids (Piles).—This is not a common disease, but it does happen at times. When present there appears a blood-red tumor, after the horse passes feces, which is sometimes drawn in, and at others it may be seen at all times. Treatment: It should be scarified and all the blood squeezed out, then well washed with warm water and bathed with acetate of lead one ounce, tincture of opium two ounces, water one quart; shake up each time it is used. Give soft food with two drams of sulphate of iron once a day.

Prolapsus (Protrusion of the Rectum).—This is caused by violent straining, constipation, and a weakened state of the walls of the intestine. After the bowel remains out for some time, it swells and becomes dark colored and cold, caused by its being strangulated. I have treated cases of this kind when it has been out for several days, black and very foul smelling and the animal much emaciated. Treatment: Put the animal in a good, comfortable place, and give the horse or ox two

drams of opium in a pint of raw linseed oil; or if the animal is very weak, give a good stimulant, half a pint of whisky. Put a teaspoonful of carbolic acid into half a pail of hot water and bathe the part for half an hour, then apply lead acetate one ounce; tincture of catechu, one ounce; tincture of opium, two ounces; water, one quart. After it is well bathed with a little of this, return it by gentle pressure. Keep it in with your hand for a short time, then put on a truss, the same as is used for falling down of the womb. It will be necessary to watch the animal for ten or twelve hours. Give bran mash once a day with a dram of nux vomica in it, for a week or two. If the outside sloughs off and there is a foul smell, add two drams of carbolic acid to the above lotion. If this is properly attended to, very bad cases will recover.

Hernia is a protrusion of the gut through some part, usually through the walls of the abdomen. They may be congenital, that is present at birth, or acquired, when they appear suddenly later in life. They are also divided into reducible or irreducible, as the bowel can or cannot be replaced. Hernia is dangerous to life only when it becomes strangulated. It is called strangulated hernia when it is constricted, when it passes through the opening, or when feces accumulate in the sack and cannot return, or from congestion of the protruded part; and if it is not relieved, mortification of the strangulated part takes place and the animal dies. The symptoms of strangulated hernia are a con-

stant pain, the animal lies down and rolls, as in colic, but continuously. When inflammation sets in in the part, the pulse becomes fast, the breathing heavy, and the animal sighs. If the hernia is discovered, it will be found to be enlarged, hot and tender to the touch. It should be reduced if possible by turning the animal on its back or side, according to the position of the hernia, and by careful, steady pressure with the fingers on the tumors it will sometimes pass in through the opening and the animal is relieved. If this cannot be done, the opening will require to be made larger with the knife. This is done by cutting through the skin at the side of the bunch, then feeling for the opening with the fingers, pass the finger through the opening at the side of the imprisoned gut, then enter the knife alongside of the finger with the cutting edge towards the muscle, then cut outwards large enough to allow the sack and its contents to be returned. A knife with a probe point is the safest. Then the best way of closing the opening is by means of steel skewers passed through the skin and flesh, about an inch back on each side from the opening, using one, two or three according to size of opening, and by putting a cord around the ends of the skewer and pulling it tight, will bring the edges of the opening together. Then put a bandage around if it can be done. Let the skewer remain in until the opening is closed. My reason for using skewers when they can be used is because thread or cat-gut will slough off

too soon, usually before the part heals. In case the skewers cannot be used, cat-gut is the next best.

Umbilical hernia is caused by a nonclosure of the navel opening, and is usually seen soon after birth. It is best to let it alone until the animal is one year old, and if nature has not reduced it, an operation on this kind of hernia is always successful. Place the animal on its back and then press in the bowel; then take the sack by the center and pull it upwards; then pass a small skewer (a piece of wire the size of a knitting needle and about two inches long, made sharp on one end, will do) through the sack close to the flesh; then tie a small cord around the sack below the skewer tight enough to stop the circulation, but not too tight or it may slough off too soon. If it does not slough off in ten days, tie on another cord. By the time it sloughs off the opening will be closed and there will be no further trouble.

Inguinal hernia takes place in stallions and young animals far more frequently than old. A fold of intestines passes into the inguinal canal, through which the spermatic duct passes from the testicle into the pelvis. Whenever a stallion is affected with symptoms of severe colic, the rectum should be emptied of its contents by injections of warm water, then oil the hand and pass it into the intestine and feel for the internal ring. The imprisoned intestine will be felt. Symptoms: The retraction of the testicle on the affected side, cold

sweats about the scrotum and thighs, looking around to the side affected. The history of the case will aid our diagnosis. Treatment: Cast the animal and turn it on its back. Then pass the hand into the rectum and by manipulation the intestine, in the majority of cases, can be pushed back. If not, call a qualified veterinary surgeon.

Scrotal hernia is frequently seen in young foals. The reason of this is that the inguinal canal is large and the intestine smaller and the membrane holds the intestines in their places much longer and looser in comparison with the size of the colt and the full grown horse. It is detected by the enlarged condition of the scrotum. It feels to the fingers soft and doughy. If it becomes strangulated it causes symptoms as described. Treatment: In the foal nothing should be done and in the majority of cases it will right itself. As the colt grows, the membrane contracts and the intestine is drawn up into the cavity of the abdomen. If not by the time the colt is two years old, it can be castrated by the covered operation. When it happens in the stallion it will likely become strangulated and cause severe pain. I have been called to several cases where a stallion had been doing service, and was seized with pain, which had been treated for colic for several hours, without any benefit. On hearing the history of the case I directed my attention to the scrotum, which I found much enlarged and doughy to the feel. Had the animal cast on its back and by passing one hand into the rectum and pressing

the intestine forward and downward the other hand pressing on the scrotum, relieved the animal in a few minutes. The animal should not be used for any purpose for a week or ten days. If this cannot be accomplished in this way the horse will have to be operated upon.

Ventral hernia is the name given when the bowel or its covering passes through an opening in the walls of the abdomen. This is usually caused by injuries. Soon after the accident happens there will be considerable swelling of the surrounding tissue, which makes it sometimes difficult to determine whether there is a hernia or not. This inflammation or swelling is best reduced by constant applications of acetate of lead, one-half ounce to the quart of water. In the majority of cases of this kind of rupture it is best not to do anything after the swelling is reduced. This kind of rupture seldom becomes strangulated.

CHAPTER IV.

DISEASES OF THE LIVER.

The majority of the diseases of the liver in animals are difficult to detect during life, and it is only on post-mortem examinations that it is found that the liver has been diseased. Indeed, it is wonderful sometimes to find such a diseased condition of this organ, and yet the animal having been in apparent good health and flesh up to the time when it was killed. On the other hand I have seen cases of great emaciation and dropsy, especially in cattle, from diseases of this organ.

Jaundice.—This disease is sometimes seen in the horse and ox. I had a well-marked case of jaundice in a horse. It presented the following symptoms: Dullness, loss of appetite, some fever, feces light-colored, urine scanty and dark in color. The membrane of the eyes, mouth, and nostrils were very yellow, and the animal's breath was very foul smelling. At first the mouth was dry and somewhat clammy, the pulse sixty-six and strong, the animal seemed stiff on being moved, and if left alone would stand in one position for hours; the bowels were somewhat constipated. This horse had been well fed, with very little work and that irregular. In this case the treatment was as follows: Aloes, six drams; calomel, one dram; made into a ball, or it

could be given in oatmeal gruel; nitrate of potassium in half-ounce doses three times a day in the drinking water. After the physic operated it got one dram of diluted nitro-hydrochloric acid three times a day in half a pint of cold water for one week, and by this time the animal had completely recovered. Gamgee mentions an animal which died of jaundice, caused by a blocking up of the gall duct by gall stones. Hydatids, abscesses and other enlargements blocking up the gall duct will cause jaundice and may be the death of the animal. Cattle are sometimes affected with jaundice. For them Epsom salts in doses of one and a half pounds, dissolved in half a gallon of water, and given at one dose. After the physic operates give the acid as above mentioned.

CONGESTION OF THE LIVER.

This is not a common disease among animals, but it is sometimes seen in horses and cattle that have been highly fed on stimulating foods.

Symptoms: There is high fever, fast pulse, from eighty to ninety in cattle, and sixty to eighty in the horse; the temperature is one hundred and three to one hundred and five, appetite is lost, there is considerable thirst, and it has been noticed that the limbs and ears are cold, the eyes are dilated and blanched, the animal is very restive and looks around at its right side; the horse is stiff, and if made to walk will be lame in its right fore leg, the urine is high colored, the breath is foetid, and the mouth is hot and clammy. If the animal is not

soon relieved its brain becomes affected and it will die of convulsions. In making post-mortem examinations of cases of this kind the liver is found enlarged and distended with blood; in some cases it may be only in patches, the other parts being of a gray or light brown color, which shows that it has undergone change when the disease has been of longer duration; very often it is found that the capillaries of the liver have given way and the blood has extravasated into the liver tissue, and that it is badly broken up and is only held together by its capsule.

Treatment: For the horse, give aloes, one ounce, as a physic; for cattle, one and a half pounds of Epsom salts; this to be followed by giving a stimulant of spirits of nitrous ether, two ounces in half a pint of cold water, three times a day. After the physic has operated take four ounces sulphuric acid diluted, compound tincture of cinnamon four ounces, mix, and give a tablespoonful in a quart of water three times a day to horses or cattle until the animal improves. If the liver remains inactive after this treatment, give one dram of the extract of podophyllum and one dram of calomel, made into a ball or given in a quart of oatmeal gruel once a day until it acts on the bowels.

HEPATITIS (INFLAMMATION OF THE LIVER).

This derangement is sometimes seen in both horses and cattle, and is caused by their being in too plethoric conditions in hot weather. It is said also to be caused by changes of temperature, of

food, and from want of exercise. I have seen it caused as a result of distemper and influenza, ending in the formation of an abscess and death.

Symptoms: In the early stage of the disease it is very difficult to tell what it is. Usually there is a yellowness of the membrane of the nose, eyes, and mouth, and if any part of the skin of the animal is white it will have a yellow tinge; there is fever, indicated by loss of appetite, hot, clammy mouth, fast pulse, and rather full in the early stage. If it is a cow it will moan if made to move, or if it is pressed on the right side, but does not go lame as the horse does, the secretions of bile are arrested, the bowels will be constipated, and the feces dry and coated with mucous. The milk will be scanty and of a yellow color, and the cream thick and ropy. The animal suffers much pain at times and is very restless. When abscesses form the animal becomes very much emaciated, the hair is dry and stands up, the animal may eat some food, but usually very little, and it pines away and dies. It is only on making a post-mortem that we ascertain the true nature of the disease.

Treatment: Apply a blister to the right side and give a dose of physic, aloes for the horse and Epsom salts for cattle. If the fever is high give from twenty to thirty drops of tincture of aconite every two hours until the pulse is lower; also give half ounce doses nitrate of potassium three times a day in the drinking water. When the acute stage is over give dram doses of diluted nitro-hydrochloric acid in a pint of cold water three times a day.

CHAPTER V.

DISEASES OF THE RESPIRATORY ORGANS.

Acute Catarrh.—Catarrh, or cold, is an inflammation of the membrane lining the nostrils and the cavities of the face and head. It is attended with a watery, then with a mattery discharge from the nose, and occasionally with cough and sore throat.

Causes: The direct causes of acute catarrh are exposure to cold and wet, particularly when heated and weakened from overwork, and in contact with animals suffering from the same disturbance. When animals are placed in damp, badly ventilated stables, or when they are standing when the system has been weakened by over-driving, the influence of the cold suddenly applied acts detrimentally upon them.

Symptoms: Are sneezing, redness and dryness of the membrane of the nose, then a watery discharge of an irritating character, succeeded after a few days by a turbid yellow discharge. The linings of the eyelids are more or less affected, and there is a copious discharge of tears. If the throat is affected, there will be a cough. The fever in some cases is very slight, the appetite remains unimpaired, and there is no alteration of the pulse or breathing. In other cases there is considerable fever, the appetite diminished or may be lost, the

pulse from sixty to seventy, and the temperature one hundred and one to one hundred and two; the animal hangs its head, the coat stares or there may be shivering fits, the breathing is accelerated, and the animal has a desire for water. In some cases the animal stands, and, if moved, seems stiff; the legs and feet are cold, the urine thick and scanty. The disease usually in the otherwise healthy horse runs its course in ten days to two weeks. In all cases it is better not to work horses suffering from a simple cold, as the exhaustion caused by the work is very liable to set up lung trouble. In some cases the membrane of the nose becomes weakened by the disease and the animal suffers from chronic catarrh with a discharge from one or both nostrils. If the sinuses of the face and head are affected the disease is called nasal gleet.

Treatment: With all mild forms of catarrh no treatment is necessary, but rest and attention to the animal's comfort. If possible put the horse in a roomy, light, and well ventilated, but not cold place. In all cases where fever is marked it will be needful to give medicine to assist the animal through the fever. It is best to give the medicine in the drinking water. If the throat is sore and swallowing difficult, it will be necessary to give it as a drench. Great care must be taken in giving medicine when the throat is sore. For reducing the fever take two drams of chlorate of potassium and two drams of nitrate of potassium, and give twice daily in the drinking water. If the throat is sore and the cough troublesome, give one dram of

camphor and one dram of belladonna, dissolved in an ounce of glycerine, then add one-half pint of gruel, and give at one dose three times a day. Rub mustard on the throat and between the jaws. Besides this, great benefit will be obtained by steaming the nostrils, by taking a pail of boiling water and putting a piece of camphor about the size of a walnut in it and holding it under the nose for ten or fifteen minutes at a time, three times a day. Give the animal plenty of clean, cold water to drink, and any kind of food it will eat. After the animal becomes convalescent, give one dram of sulphate of iron, and a tablespoonful of ground gentian at a dose in a bran mash twice daily. During the fever blanket the body and hand-rub and bandage the legs. If the bowels are constipated, give injections of warm water, or if necessary, give a pint of raw linseed oil, but do not give strong purgatives.

CHRONIC CATARRH.

Is sometimes the result of a neglected case of simple catarrh. There is a discharge from the nostrils, and when we look at the mucous membrane of the nose it is of a leaden hue. There is often an unthrifty condition of the coat, but usually the appetite remains good. When the discharge is thin and of a bluish color it is termed nasal gleet. The sinuses of the face and head sometimes get filled up with matter and bulge out, which can be easily seen, and when tapped with the finger emit a dull sound.

Treatment: Give a dram of sulphate of copper

at a dose three times a day in a small bran mash. Steam the nostrils with a pail of hot water, in which two ounces of turpentine have been put. Keep this under the animal's nose for ten minutes at a time, two or three times a day; or make a hot bran mash and put one dram carbolic acid, iodine, or sulphuric acid in it. If the sinuses are bulged out, they must be opened. A trephine is the best instrument for this purpose. A small piece of skin about the size of a silver dollar is removed, then a piece of the bone is sawn out. Then clean it out with a syringe and use carbolic lotion. Wash out twice a day. After treatment with copper for a few weeks and the animal not improving, give one-half ounce of Fowler's solution of arsenic twice a day in a mash. All animals affected with chronic catarrh should be kept by themselves in case of affecting others, as it may become a case of glanders.

Epistaxis (bleeding from the nose).—This derangement is not of frequent occurrence in horses or cattle, but it sometimes takes place.

Causes: Sneezing, coughing, or any violent exertion, pulling heavy loads, or driving too fast, a tight collar or bearing rein, especially if the animal is fat, or injuries to the mucous membrane.

Symptoms: The blood oozes from one or both nostrils, or may be forced out in a stream by violent sneezing. The blood is of a dark color. Bleeding from the lungs comes always from both nostrils, and is of a bright scarlet color and frothy.

Treatment: Tie up the animal's head and apply

cold water or ice to the back of the head. Strong alum water should be injected, or acetate of lead half an ounce, water one pint; or flour may be blown into the nostrils. I have had good success from blowing prepared chalk. In very bad cases the nostrils will have to be plugged. Take tow or some soft substance and tie a soft string around it, then press this into the nostril; never plug both nostrils at once. Hypodermic injections of tincture of ergot of rye, one to two ounces, are sometimes useful.

LARYNGITIS, OR SORE THROAT.

This is an inflammation of the soft tissue and mucous membrane of the larynx, and occasionally extending to the windpipe.

Causes: The same as catarrh. A very common cause is bringing a horse from a cold to a warm stable, or when the animal is first brought in from the field and put into a close stable.

Symptoms: Pain in the throat when the animal is swallowing food or water, or when the throat is slightly pressed. The horse keeps his nose elevated so as to ease the throat. The mouth contains a quantity of ropy saliva, the animal's throat being too sore to swallow it. Cough is easily caused by attempting to swallow, and fluids are ejected through the nose. At the beginning the cough is hard and rather rough; when the morbid action advances, and the discharge is considerable, the cough becomes soft and the sound less rough. There is more or less fever. The pulse from sixty to eighty,

and the temperature is somewhat increased. The animal seems afraid to eat, and when it does and attempts to swallow, it brings on a fit of coughing, in some cases nearly suffocating the animal, and the chewed food will be forced partially through the nose. From the effects of the inflammation the soft structures of the throat may swell to such an extent as to cause suffocation, and this takes place sometimes in a few hours; there may be no external swelling, although it is sometimes present. The breathing becomes very difficult, with a loud, rough sound that can be heard several yards away. When this takes place treatment requires to be prompt to prevent the animal from suffocating. Should life be prolonged for a few days, the breath becomes very foetid, and the discharge from the mouth and nose is very offensive. In some cases of this affection a thickening of the membrane of the throat causes thick wind or roaring.

Treatment: In this disease, in the majority of cases, it is impossible to give medicine, as the animal cannot swallow, but if it can swallow water, give two drams of chlorate of potassium and two drams of nitrate of potass. in the drinking water three times a day; steam the nostrils with hot water with a piece of camphor in it. This should be done in bad cases and when there is a tendency to suffocation almost continually. Apply mustard to the outside of the throat, and put a piece of blanket over it. Repeat the mustard in two days. Also gargle the throat with the following: The fluid extract of belladonna, one

dram; chlorate of potass., one dram; water, half a pint. Shake up well, elevate the head and pour a little into the mouth, and rub the tongue with the fingers to make it move, so that the gargle will reach the sore part. When the animal wants to cough let the head down, and when it gets over it pour in a little more, and so on until the half pint is all used. In bad cases this should be done often. I have been called to cases where the horse was in great distress, and by persevering with the above treatment, in a few hours the animal would be greatly relieved. If there is swelling on the outside of the throat, great benefit can be obtained by fomenting with hot water or applying hot poultices of linseed meal, changing as soon as they get cool. Some recommend cotton wool soaked in hot oil and put around the neck. If there is a possibility of suffocation, the animal should be watched, and we ought not to risk the chance of this, but perform the operation of tracheotomy. This operation is performed by feeling for the windpipe, five or six inches below the throat. At this part there is very little flesh. Take a sharp knife and cut through the skin and windpipe, making a cut about two inches in length. The animal's head should be held up by an assistant, and as soon as the opening is made, let the head down, so that the blood will not run into the windpipe. Sponge the wound with acid carbolic, half an ounce; water, one quart, to wash away the blood. Then put in a tracheotomy tube, and if one is not at hand get a piece of stiff gutta-percha tube about half an inch in diameter, and

cut two holes in the side of it to tie two pieces of string; tie this around the neck, and insert the other end into the windpipe; this will give immediate relief. The tube should be removed once a day and cleaned with carbolic acid, half an ounce; water, one quart. Several times a day the hand should be placed over the mouth of the tube to find out how the animal can breathe through the nostrils, and when it is able to do so, the tube can be withdrawn, the edges of the wound cleaned and brought together by pins or stitches through the skin on each side, and bathed once a day with carbolic lotion. Usually the animal recovers. Although, if the operation has not been done before the animal was in a dying condition, it does not usually survive. If the cough remains after all other symptoms have disappeared, blister the throat with biniodide of mercury, one and one-half drams; vaseline, two ounces; repeat every second week for a month or two; also give one dram of iodide of potassium in the drinking water in the morning, and two drams of sulphate of iron in the evening in a bran mash, made by boiling a teacupful of flaxseed in two gallons of water and mixing it with bran. This ought to be kept up for three or four weeks, or give Fowler's solution of arsenic, one ounce, in bran mash once a day and continue it for a month.

BRONCHITIS.

Is an inflammation of the tubes of the lungs, characterized by a harsh cough, accelerated breathing,

a soft, frequent pulse, with more or less fever.

Causes: It is often the result of sore throat or the same causes as catarrh, and is often caused by smoke and the inhalation of irritating gases; or solids and fluids passing down the windpipe instead of the gullet; changes of the atmosphere, as prevailing cold winds combined with moisture, and from a deranged condition of the system from other diseases. I have seen some cases of it in which I could not find any cause.

Symptoms: The horse is dull, hangs its head, the breathing is greatly increased, the appetite is impaired, there is a short, dry cough; in the early stages of the disease the pulse is increased in frequency. As the disease advances the cough becomes more troublesome; it is loud and rough. On placing the ear at the root of the windpipe there will be a loud, rough rattle, or if the smaller tubes are affected the sound can be heard behind the shoulder. The difference between bronchitis and laryngitis is, the sound gets louder the farther down you put the ear on the windpipe, and the sound can also be heard behind the shoulder. In laryngitis it is loudest in the upper part of the windpipe; also the animal can swallow in bronchitis without difficulty, while in laryngitis it cannot. It is therefore easily distinguished. After the first few days the cough becomes softer and the sound instead of being rough is soft as if the air was passing through bubbles of mucous. At this time the mucous membrane, instead of being dry as at first, is now pouring out

a thin mucous, and the animal coughs up a considerable quantity through its nose. If the small tubes have been affected, the outpourings of this mucous sometimes block them up, and the animal dies from suffocation. After the disease has gone on for six or eight days, the animal begins to improve. But if the breathing becomes faster and shorter, and the pulse fast and weak, and the discharge from the nose becomes foul smelling and of a dirty brick-red color, this indicates that the animal will die. The horse stands through the attacks. Cattle usually lie on their breastbone.

Treatment: Place the animal in a comfortable place with plenty of fresh air, but out of draughts; clothe the body and if the legs are cold, hand-rub and bandage them. In the early stage, when the cough is rough and hard, give two drams of chlorate of potassium and one dram of the fluid extract of belladonna, in half a pint of water, three times a day. If the pulse is full and soft, give fifteen to twenty drops of tincture of aconite in the drinking water every three or four hours until the pulse is slower and firmer. Half an ounce of the tincture of squills in half a pint of water given twice a day is sometimes very useful. The inhalations of vapor of hot water with a piece of camphor about the size of a walnut will relieve the irritation of the bronchial tubes very much and should be used several times daily. If the inflammation is extensive and the air cells involved and the breathing difficult, the application of mustard to the sides, or soap liniment rubbed in well twice a day, is of bene-

fit. I do not think strong blisters ought to be used, as they cause too much irritation. I have seen the fever increase rapidly after the application of a cantharidian blister to the sides. If the bowels are confined, injections of warm water will usually relieve them. Purgatives are too reducing in this disease. When the acute symptoms have subsided and the appetite is poor, one ounce each of tincture of gentian, tincture of ginger, and aromatic spirits of ammonia in half a pint of cold water given three times a day will stimulate the appetite and strengthen the animal. As convalescence proceeds and the appetite improves, give one dram of sulphate of iron and half a dram of nux vomica at a dose, twice a day, in bran mash or ground oats. During all stages of the disease give half ounce doses of nitrate of potass. in the drinking water twice a day. This keeps the kidneys active and cools the system. The animal should not be put to work for two or three weeks after convalescence.

CONGESTION OF THE LUNGS.

Congestion of the lungs is an over-filling of the blood vessels with blood, often causing rupture of the small ones, allowing the blood to escape into the lung substance. It is caused by over-exertion when the animal is not used to fast work. No animal should be driven fast for a length of time without first having been trained, and even then it will sometimes take place. In some cases there may be frothy blood coming from the nostrils. The pulse is small and indistinct, although the

artery feels full under the finger and may be beating at the rate of eighty to one hundred per minute, although we cannot count the number of beats. The veins of the skin stand out, especially over the head. The heart is beating tumultuously and jerking. On applying the ear to the side, a sharp, fine cracking sound may be heard. The horse in this condition makes no attempt to eat or drink. Treatment: Clothe the body and hand-rub and bandage the legs and give a stimulant. I find that one ounce of aromatic spirits of ammonia and two ounces of spirits of nitric ether given in half a pint of cold water and repeated in half an hour if necessary, usually gives relief. Half a pint of good whisky in a pint of cold water and repeated in one hour; or if nothing else is at hand, two tablespoonfuls of ground ginger dissolved in a pint of hot water, and given as hot as it will bear, is useful. Allow plenty of fresh air, but keep the animal as warm as possible.

HAEMOPTYSIS (BLEEDING FROM THE LUNGS).

Bleeding from the lungs occurs from acute congestion of the lungs, from rupture of the tissue of the lungs or a blood vessel, or it may be caused from tuberculosis or ulceration, also from severe exertion. Symptoms: The flow of blood may be only slight and soon stop of its own accord. There is usually a cough caused by the blood in the bronchial tubes. The blood that is coughed up is of a bright scarlet color and frothy. This is caused by the air forming air bubbles; sometimes if it is ex-

cessive it will cause suffocation. Treatment: If it is only in small quantities it will likely cease by keeping the animal quiet; if it is severe pour cold water over the back and give hypodermic injections of tincture ergot of rye every half hour until it stops; use one ounce at an injection. It is dangerous to give drenches of medicine by the mouth in case of causing suffocation. If the animal can eat give sulphate of iron in two-dram doses three times a day or one dram of acetate of lead three times a day for two days if needed. Inhalations of hot water and turpentine are useful when it is caused by ulcers or tuberculosis.

PNEUMONIA.

Pneumonia is an inflammation of the lung substance. Causes: It is more prevalent during spring and autumn, particularly when cold, wet winds prevail, when the animal is shedding its coat or when it is weakened from other diseases, such as congestion of the lungs, influenza, distemper, and sometimes from disease of the digestive organs; confined in badly ventilated stables where the animal has to breathe foul air. This is a very common cause in the large cities, and it is the most difficult to treat. Symptoms: If the animal is noticed in the early stage, there is generally a chill which may cause it to shiver; the animal is dull and refuses its food. The pulse is full, but soft, and in some cases, not easily counted, usually from sixty to eighty beats per minute. The temperature will be increased to one hundred and three and one

hundred and four and five. There is a dry cough which, in some cases, is very troublesome. The breathing is not much increased at first. The horse does not lie down until it is convalescent, and this symptom helps us greatly in forming our opinion as to the nature of the disease. The membrane lining the eyelids and nose is of a dirty brick-red color, and the bowels are usually confined. In applying the ear to the sides the sound of the air passing will be rough at first, gradually getting less until very little sound can be heard. As the disease progresses and the lungs become consolidated, there will be no air sound in that part. They will keep in this stage for a week, then there is usually a change either for the better or worse. If the animal is improving it will look brighter, will eat a little, and move around more in the stall, prick up its ears at any sound, the pulse will be stronger and more distinct and less frequent, the breathing will also be more natural and the animal may lie down. On the other hand, if the animal is getting worse the breathing will be much increased. The horse shows distress by being restless, takes no notice of sounds, will not eat or drink, the pulse is from eighty to one hundred per minute and small, there will be a discharge from the nose often tinged with blood and foul smelling, which can be felt sometimes before you reach the animal. There will be more or less heaving at the flanks, which increases until the animal dies. Treatment: In the early stages, if the animal is fat and the pulse full, give twenty to twenty-five drops of tincture acon-

ite in a little water every two hours until the pulse is slower and weaker. Also give nitrate of potassium in half ounce doses three times a day in the drinking water. Blanket the animal and bandage the legs of the horse. If the cough is troublesome give one dram of opium made into a ball three times a day. Cold linseed tea is very useful to keep the bowels regular as well as an article of food. It may be necessary to give an occasional injection of warm water if the bowels should become constipated, or a pint of linseed oil. Strong purgatives should not be used, as they may cause too much irritation to the mucous membrane of the stomach and bowels and so cause death. When the animal becomes convalescent give one dram of sulphate of iron and thirty grains of quinine made into a ball with linseed meal or bread twice daily for two or three weeks. Do not put the animal to work until fully recovered, and then it should be worked light.

HEAVES (BROKEN WIND).

Broken wind, or heaves, is distinguished by difficult breathing accompanied by cough. It is non-inflammatory and varies according to the season of the year, and how the animal is fed, and what it is fed on, and the work the animal has to do. The difficulty is caused by a nervous contraction of the lung tissue, which also causes the cough. The nerve which supplies the lung passes to the stomach and the heart and by a deranged condition of either the stomach or heart will, by reflex action,

disturb the breathing, and we find this the case in heaves. I have made a number of post-mortem examinations and failed to find, either by the naked eye or the microscope, anything wrong with the lung, although the animal had been affected with heaves for a number of years. There are horses whose lungs have been affected with inflammation and a part becomes consolidated which will heave just as a heaving horse would do; but the great majority of horses affected with heaves have no apparent disease of the lungs, therefore the majority of the profession find and believe it to be a deranged state of the digestive organs. Professor Robertson says: "It is generally admitted to be true that to this abnormal condition is attached a certain amount of disposition or capability of propagation from parent to progeny. Not that those who support this idea suppose that the exact paralysis of lung-tissue is received as an inheritance from parent, but rather that, born with a certain bodily conformation or temperament, the animals are, under the same conditions and surroundings, more liable to become sufferers from this particular disordered condition than others not possessed of the same congenital constitutions." Certain breeds of horses are more subject to heaves than others. Coarse-bred, high-boned, pot-bellied animals are more frequently affected with it than the fine, round, well-built horse. The kind of food the animal is fed on and also the quantity is a cause of heaves. Musty, innutritious, bulky, dusty food, with a full allowance of water and put to

work, is a very common cause of heaves. Certain kinds of timothy hay seem to be notorious for producing it. Good, clean straw and clover hay, when it is fed sparingly, is much better for horses than pure timothy hay. If heaving horses are fed largely on oats with very little hay, and watered before being fed, and not put to work for an hour at least, they will do a fair day's work. Gamgee says that heaves follows the introduction of artificial grasses. Symptoms: When fully developed it is easily recognized and is so well marked that it cannot be mistaken. The air is easily drawn in, but there seems to be a difficulty in expelling it, and it takes a double effort to do it, causing the animal to heave. In the early stages it is not so easy to detect it. Cough is often a forerunner of it. The cough is peculiar. It is short and suppressed, as if it was averted in the expulsion, and is often accompanied by a forcible expulsion of gas from the anus. It seems to follow the slightest exercise, even the act of drinking will bring it on. It is more troublesome after a full meal and a liberal allowance of water. Indigestion and an unhealthy appearance of the animal, the intestines enlarge and the belly drops down. The appetite may not be impaired, but there is want of assimilation and the animal does not get the good of the food it consumes, therefore heavy horses are usually weak, and when put to hard work very soon give out. A confirmed broken-winded horse is only fit for slow, light work. Treatment: Feed so as not to overload the stomach; allow a little hay to be eaten

first, then water and then the oats. Never feed more than twelve to fourteen pounds of hay per day and fifteen pounds of oats. Boiled flaxseed mixed with a little bran at night will keep the bowels regular, besides being very nutritious. Sulphate of iron, four ounces; nitrate of potass., four ounces; nux vomica, two ounces, divided into twenty-four doses, and one given every night in bran mash, is very useful. After this quantity has been given, skip two or three weeks, and repeat. One ounce of Fowler's solution of arsenic given every night in small bran mash, when the animal is at work in the spring, is very good and often enables an animal to do a good day's work, which it could not do but for the arsenic. This can be continued for a month or six weeks without any danger to the animal, then stop for a few weeks or as long as the animal can do without it, and when the breathing becomes difficult, resume again and so on. I have treated horses in this way and they would do their work with ease for years.

PLEURISY.

Pleurisy is an inflammation of the serous membrane lining the cavity of the chest and covering the lungs. This disease is caused by injuries to the walls of the chest, or from exposure to cold when the animal has been heated. I have seen a number of cases following clipping late in the fall or too early in the spring. It is often connected with pneumonia and disease of the heart. It sometimes takes place without any apparent cause and is

probably the result of some morbid state of the blood. It may affect only one side or both. Symptoms: It is usually ushered in by slight or severe chill, followed by fever, quick and painful breathing, interrupted by a short cough, almost continuous. The animal is restless and if made to move will evince pain and stiffness, which may be taken for founder. The difference can be easily detected by the pulse, which in pleurisy is small and hard, while in founder it is full and soft. On backing the horse, if it is pleurisy it will lift its fore feet although it may give it pain; if founder, it will not lift its fore feet from the ground, and if forced will drag its feet, and arch its back, have its hind feet forward under its belly. The expulsion of the breath is principally done by the muscles of the abdomen, and the ribs kept as fixed as possible. There is a depression or line running along the cartilage of the false ribs. This is well marked, even in the early stages of the disease. The animal will look around at its side or sides, and show signs of colic, but will rarely lie down. If made to move suddenly will grunt. On applying the ear to the sides you will hear a grating sound every time the animal breathes. This is caused by the dry, inflamed surfaces rubbing together. After a few days, friction sound passes away, and we either hear no sound or we may be able to hear the sound of fluid. At this time, if the pulse becomes small and fast and the breathing is more heaving, there is danger of effusion taking place. At this time, if effusion has taken place, on applying the ear to the

chest or root of the neck you will hear a splashing sound every time the animal breathes. On the other hand, if the pulse becomes slower the breathing more natural and the animal moves about with more ease, the appetite returns, and the animal lies down quiet, it is a sure sign of recovery. Treatment: In all cases of pleurisy no matter how slight it is, the animal should be placed in a comfortable, loose box, with plenty of fresh air, the body well clothed and the legs hand-rubbed and bandaged. Some recommend to bleed the animal until the pulse becomes soft. My experience is that in the majority of cases it is better not to bleed. The fever can be reduced by giving tincture of aconite in doses from fifteen to twenty-five drops every two hours, and nitrate of potassium in half ounce doses three times daily in the drinking water. As soon as the pulse is reduced in strength and frequency, stop the aconite, but continue the potassium. If the pain is severe opium in dram doses should be given three times a day in a little gruel or a ball. As well as relieving the pain it will reduce the cough. Hot fomentation to the chest or blankets wrung out of boiling water and changed every half hour and hot linseed meal poultices are good. If this cannot be done rub in well compound soap liniment and cover up with hot blankets. If the pain continues after giving the above treatment, apply a blister of cantharides, two drams; lard, one ounce and one-half. Repeat on the second day if needed. After the acute stage is passed, which will usually take place about the

fourth day, we find the animal requires stimulation and the best is one ounce tincture of ginger, gentian, and chloride of iron, given at one dose, in a pint of water, two or three times a day. Continue the potassium, as it will keep the kidneys active, which is particularly necessary in pleurisy. If the animal improves, continue this treatment; but if effusion is taking place it will be necessary to give, besides the above, one dram of iodide of potassium once daily in the drinking water. Give good food and improve the appetite by giving one dram sulphate of quinine with fifteen or twenty drops of nitric acid in a quart of gruel. If liquid has formed in the chest as the result of the disease, give five grains powdered cantharides, and digitalis twenty to thirty grains, twice a day. Continue the tincture of ginger, gentian and chloride of iron. Repeat the blister to the chest if the skin is not broken by the previous one. If the fluid still keeps accumulating it will be necessary to tap the animal. This is done by cutting the skin between the eighth and ninth rib and pushing a small trocar and canula into the cavity, then draw out the trocar, leaving the canula in and the fluid will run out. After the fluid has been removed it will be useful to give the horse half a pint of good whisky as a stimulant. It is not necessary to remove all the fluid—as this cannot be easily done. The opening made into the chest should not be too low, about midway between the superior surface of the fluid and the bottom of the chest. This operation will often have to be repeated as the fluid

will have a tendency to accumulate again in two or three days. If the animal has not sufficient strength, I find the operation is of little use; but if the animal is strong it will often save its life.

Chronic Cough.—What is chronic cough? When an animal coughs beyond the limited period usually assigned to a cold, it is called chronic cough. There are several causes of cough in the horse; first, from a thickening of the membrane of the throat caused from distemper or colds; second, it may be the forerunner of heaves; third, it may be caused from some lung trouble or a nervous irritation of the throat. If possible, find out the part affected; if it is caused by a thickening of the membrane, nothing can be done for it; if it is the commencement of heaves, the treatment for that disease may relieve it for a time; if it is caused by an irritation of the throat, such medicines as opium and belladonna may be tried. There is no sure cure for chronic cough.

Goitre (Enlarged Thyroid Glands).—This disease consists of enlargement of the glands of the throat just behind the angles of the lower jaw, and is a common disorder in horses and cattle in districts where there is an abundance of lime in the soil, and usually the drinking water is impregnated with it. This is said to be the cause, and although it is much more prevalent in limestone districts it is frequently seen in all parts of the country and in animals that are kept in close, badly ventilated stables, and in some cases it follows sore throat.

Symptoms: A swelling is noticed on each side of the throat where the throat latch of the bridle comes. In some cases it grows very rapidly, in others it is of slow growth. In pressing on the gland it moves easily under the skin, although it feels hard. When it grows large it sometimes interferes with the animal's wind and is unsightly.

Treatment: It is usually reduced by using the following: Biniodide of mercury, one dram; lard, one and a half ounces; mix and rub on a little every second week; also give one dram of iodide of potassium twice a day in a bran mash and continue it for three or four weeks.

CHAPTER VI.

DISEASES OF THE ORGANS OF CIRCULATION.

The heart of the horse and ox is situated in the center of the chest, with the apex inclining to the left side. Therefore, when the horse and ox are in a healthy state you cannot hear or see the motion of the heart from the outside, but on severe exertion it can be both seen and felt. If in the horse or ox, while standing quiet or after moderate work, you can hear the beating of the heart, it will indicate that there is some derangement of this organ, and the horse will be considered unsound.

Palpitation of the Heart.—Is usually caused by a deranged condition of the nerves supplying the heart; and as these nerves are connected with the nerves of the stomach, it often happens when the stomach is affected by disease that it may cause palpitation.

Causes: In the horse, fast driving, if long continued, especially if the animal is not used to it; blood diseases or impure blood from reducing diseases; influenza, or other epizootic affections. In cattle, it is often the result of dyspepsia and nervous diseases.

Symptoms: The principal symptoms are powerful and jerky action of the heart, frequent and

small pulse, anxiety, and often loss of appetite. In some cases the jerking is so violent as to shake the whole body of the animal, and to be heard at a considerable distance, and may be mistaken for spasms of the diaphragm. If the heart is the organ affected, the jerk and sound will take place with each beat of the pulse. Palpitation of the heart from disease of the heart itself will usually be irregular or intermitting, which is the most dangerous. There may be an intermitting beat of the heart without palpitation, caused from valvular disease of the heart. In some severe cases of palpitation the animal may show signs of faintness and suffocation, on the least exertion.

Treatment: In all cases of heart disease the animal should be kept as quiet as possible, and given two ounces of tincture of opium and two ounces of tincture of digitalis at a dose in half a pint of water, and half the dose repeated in two hours if the animal is not relieved. If it is caused from a deranged state of the blood, it may be necessary to give a dose of physic and dram doses of sulphate of iron twice daily, or ounce doses of hyposulphate of soda and whisky in half-pint doses three times daily. If the pulse should be strong, sometimes benefit is obtained by giving from twenty to twenty-five drops of tincture of aconite in a little water every two hours until an alteration of the pulse takes place.

Pericarditis.—Pericarditis is an inflammation of the membrane investing the heart.

Causes: Inflammation of the investing mem-

brane containing the heart is caused by injuries, such as sharp bodies passing from the stomach to the heart. This is a common occurrence to cows in cities from eating slops from the kitchen; exposure to colds, and fatigue; certain general diseases of the blood, such as rheumatism, strangles, influenza, and from the extension of inflammation of the pleura and lungs.

Symptoms: The symptoms of this form of heart disease are obscure. The animal will show signs of pain if made to move; the pulse is fast and small, but hard as if you were pressing your finger on a piece of wire; the breathing may or may not be increased; the animal shows stiffness in moving; and on applying the ear over the region of the heart on the left side we may in some cases hear a rasping sound at each beat of the heart; but this cannot be depended upon, except in some cases. There will be fever, loss of appetite, etc. In the majority of cases all that can be done is to treat the symptoms. In the early stages, when the pulse is hard and fast, and the animal in good flesh, give from twenty to twenty-five drops of tincture of aconite in a little water every two hours until the pulse becomes softer; also give half an ounce nitrate of potassium in drinking water three times a day; and if the bowels are constipated, give from one and one-half pints to a quart of raw linseed oil. If the animal is in much pain, give one dram of powdered opium in a ball or in gruel three times daily. Sometimes there is benefit obtained by applying a blister to the left side. As the disease progresses the

pulse becomes weak, and the breathing short and quick, and the legs and ears are cold; and in cattle the membrane of the nose is dry and cold, there is general stiffness, and in the horse swellings appear on the legs and under the belly. In cattle generally under the belly and in the dewlap. The horse generally stands through the disease, but cattle will lie down on their right side. The animal moans and grinds its teeth, and looks around every now and then toward its left side. When effusion takes place in the cavity you can, on applying the ear to the left side, hear a splash at each beat of the heart. After death I have found a large quantity of liquid around the heart, and in some cases a regular covering of cheesy pus between the heart and the sack. In several cases of cows, which have died from this disease, I have found a piece of darning needle, which had made its way from the stomach to the heart, setting up inflammation, causing death. It is strange how many cases of this kind are reported to have taken place in cows.

Endocarditis.—Inflammation of the inner lining of the heart, and is usually complicated with rheumatic disease. This is a very dangerous disease, and if it does not kill in the acute stage it is very likely to leave thickening of the valves of the heart, which will interfere with the passage of the blood through the heart, preventing the animal from doing fast or heavy work.

Symptoms: There is a very decided interference with the action of the heart; the beat is very irregular and violent in its action, compared with the

smallness of the pulse beat in the artery of the jaw. There is a high fever; the breathing is not much altered in the first stage of the disease. On applying the ear to the left side or root of the neck you will hear a loud metallic sound at each heart beat, and there will be a marked venous pulse caused by the action of the disease on the valves of the heart. If the inflammation is not checked, the inner lining swells, narrowing the opening with which the valves are connected, so that only a small quantity of blood will pass through, suffocation, with quick, short breathing and great distress; and if not relieved, the animal soon dies.

Treatment: I give a dose of aloes, and follow this by giving half-ounce doses of nitrate of potass. and chlorate of potassium. Also give tincture of aconite, twenty to thirty drops, combined with the same quantity of fluid extract of digitalis three or four times a day in a pint of water. Mustard poultices should be applied to the left side, and blankets be put on, and the legs hand-rubbed and bandaged.

Dilatation of the Heart.—I have seen several well-marked cases, and they all presented the same symptoms, namely, inability to work; as long as the animal was allowed to keep quiet, it seemed as if nothing was wrong with it; but as soon as it was driven fast or made to pull a load or plow, it would breathe fast and show signs of suffocation, and if forced to move on would fall over, and lie on its side with its mouth open. After a few minutes the animal would recover its breath and rise in an ex-

hausted state; but very soon it would seem as if nothing had happened to it. Some of the cases were not quite so severe as the above; they could do a fair amount of slow work and light loads. One day I was called to see a fine black horse, the property of a brewer. The driver complained that if the load was heavy or if the horse was driven fast, it would stop, breathe fast, and seemed as if it would choke. I examined the horse, and found it was suffering from dilatation of the heart, and informed the owner of the fact, and said if the horse was made to pull a heavy load or be driven fast it would likely drop and die. The horse accordingly was put to slow, light work, until one day it had to take the place of another horse, and on going up a hill, when about half way up, it wanted to stop, but the driver whipped it on, as he did not want to stop on the middle of the hill, and before he reached the top the animal fell suffocated and died. I made an examination and found the left side of the heart was greatly dilated. This disease may sometimes be mistaken for lung trouble. In dilatation there is no cough, and when the animal is quiet it seems all right; but if the pulse is examined it will be feeble, irregular, marked venous pulse, especially when the animal is moved. The legs are usually cold, and there may be a tendency to stock. As the disease advances the animal begins to lose flesh and the system generally becomes deranged; and if the animal is not used for work, it will gradually get worse, swell under the belly and legs, and after a time die; but usually

the animal dies suddenly from over-exertion. Treatment is of no service.

Hypertrophy of the heart is an increase in its size, the walls becoming very thick. There are three forms of this trouble. First, when the walls are thickened and the cavities retain their capacity; second, when the cavity becomes enlarged; third, when the walls thicken and diminish the size of the cavity. Leblanc says the origin of this disease depends on a chronic form of inflammation in its walls.

Symptoms: The impulse of the heart is much stronger than natural, and can be felt lower down; the sound is louder and metallic. In some cases that I have seen the impulse of the heart could be seen on the right side as well as the left. On looking at a horse's sides affected with hypertrophy, you can see the motion, and sometimes it can be heard at a little distance. There is no cure for it, and the animal may do slow, light work for a few years.

Rupture of the heart sometimes occurs in the horse from over-exertion and shocks; such as striking against some solid body, the result of falls. Sometimes a horse may drop on the race-course from rupture of the heart. Sudden fright will cause it. I remember one case of rupture in a young mare from being forced up to a locomotive. The animal began to tremble violently and dropped dead in a few minutes. A post-mortem revealed rupture of the left ventricle of the heart. I mention this, as I do not think it wise to force a horse

up to anything it is very much afraid of. There are a number of other diseases of the heart which are not well marked; and it is only after death that we discover the true nature of the disease. In some forms of heart disease an animal may do a fair amount of work and keep in good condition and still die from heart trouble; but the majority become unfit for hard work, and show some of the general signs of heart disease, which are: Difficult breathing on exertion, irregular beating of the heart, cold extremities, loss of flesh, and toward the end swelling of the legs and belly. The appetite usually remains good until near the end.

Injuries to the Arteries.—An accident of this kind to the horse or cattle is rare; but it does happen that an artery is cut or otherwise injured, and it is necessary to know how to remedy it. The walls of arteries are elastic, and when cut completely across will contract or be drawn into the tissue, and in this way arrest bleeding; but if the artery is pricked or only partially cut by contraction of its elastic walls it will keep the cut open. When blood is exposed to the air it clots and plugs up the mouth of the artery; but if the artery is of any size, the force of the blood through it will force out any clot that may form. In this case the bleeding can only be stopped by pressure or by ligature. If the wound is deep and the artery cannot be easily found, plug it with cotton batting dipped in linseed oil eight parts, carbolic acid one part. Let this remain in for twenty-four hours, then withdraw it. Usually after the bleeding has been stopped for

twenty-four hours the vessel is closed. When an artery is lacerated or torn it seldom bleeds much, as the torn coats are of unequal length, usually contracting inward, and consequently there is very little hemorrhage. Bleeding from an artery is known by the jerking stream of bright red blood which is pushed from the wound with considerable force. As the animal loses considerable blood and is becoming weak the jerking is more perceptible.

Treatment: Cold and hot water have both been recommended. The cold causes contraction, but prevents coagulation. Heat causes coagulation, but prevents contraction. I find in the majority of cases cold water is the most useful to stop bleeding from small vessels. In tying an artery it requires to be taken up with a pair of artery forceps and a silk thread tied firmly. In most cases both ends of the vessel require to be tied. Tie the end next the heart first, and if there is no bleeding from the other it need not be tied. Pressure at some distance or on the wound will be of service in some cases. Thus about the coronet, where there are a number of vessels, it is difficult to tie them all; and I find the best means of stopping the blood is to put on a pad, then a tight bandage; and if this does not stop it, take a small piece of rope, tie a knot on it, put the knot on the top of the pad, bring the ends of the rope around the pastern and tie it tight; this brings the pressure right on the spot. In two hours slacken the rope a little, but do not take it off, in case of starting bleeding again. In twenty-four hours the rope should be taken off, but the pad

should remain on for three days; then it can be removed and the wound dressed.

Aneurism is a tumor formed by coagulated arterial blood within a dilated artery, or between the several coats of such a vessel, or externally to it. Aneurisms may form in any of the arteries, but the superficial ones are usually found in the neck and legs. They are soft tumors, which appear in the course of the artery and pulsate at the same time as the heart beats. On applying the ear to the tumor a peculiar sound will be heard resembling hissing. If it is considered advisable to treat it, it is best done by dissecting out the tumor and applying a ligature to the artery above and below. Then cut off the tumor, but if it is not interfering with the animal's usefulness, it is best to let it alone.

Venous Hemorrhage.—An animal can lose much more blood from a vein without any danger to its life than from an artery, as the blood runs more slowly, and it has given up its nourishment to the tissues before it reaches the vein. The hemorrhage from a vein should be stopped by pressure or by pinning up the wound, as it is a bad and dangerous practice to tie a large vein, as they are made up from the union of a number of small veins, and if the trunk vein is tied, the small ones have no place to empty themselves, and the result would be stagnation of the vessels covering a large surface. Not so with the arteries. The blood is flowing from the large vessel to the small ones; and if the large one is tied, the collaterals will become enlarged, and

thereby carry on the circulation. Unless in cases of great emergency it should never be done.

Phlebitis (Inflammation of a Vein)—It is seldom that we see a case of this disease nowadays, as there are so few horses bled; but it may take place without any apparent cause. Usually it is caused by an injury. A vein may be injured and a little blood from it may get into its sheath or the surrounding tissues and set up inflammation of the vein and the tissue around it.

Treatment: Bathe the part with cold water and apply acetate of lead, one ounce; tincture of arnica, two ounces; water, one quart. Use this freely and often. If the inflammation does not seem to be easily removed, put on a blister of cantharides, two drams; lard, one ounce; repeat in a week if necessary. Give nitrate of potassium in half-ounce doses, three times a day for a few days, to keep down fever. If the bowels are constipated, give a dose of aloes. Varicose veins are sometimes seen about the legs of horses; and it is seldom they do any harm; but if they are developing, even pressure may be applied by means of pads and bandages, and a stringent lotion made of tannin, one ounce; water, one quart. Apply while using the bandage. If the walls become thin and the vessel bursts, keep the animal quiet and apply the tincture of iron and bandage as above.

Purpura Hemorrhagica is an exudation of blood through the walls of the blood vessels, the result of debilitating disease, such as strangles, influenza, etc. It may be caused from a deranged

condition of the blood vessels and other tissues of the body by animals kept in badly ventilated stables; also from innutritious food.

Symptoms of the disease are swelling of various parts of the body, more particularly about the head and face; they pit on pressure by the finger. In the course of a few days a bloody water exudes from the membrane of the nose and eyes. Very soon after it will be seen to ooze from the swollen parts. In some cases sloughing may take place. The pulse is very weak and fast, eighty to one hundred; the temperature never reaches a high point. The urine is scanty and high colored. If the intestines should be affected there will be diarrhoea mixed with blood and the animal may be affected with colicky pains. The lungs, liver and brain may become involved, and the animal soon dies. If the case is of mild form and properly treated it may recover.

Treatment: Give one ounce each of tincture of gentian, ginger, iron, and spirits of nitric ether at a dose in a pint of water twice a day; and give at noon one dram of nitro-hydrochloric acid in a pint of water. I find this the most successful treatment. Half-ounce doses of nitrate of potassium once daily in the drinking water will be useful to act on the kidneys. External applications are of no value in this disease.

DISEASES OF THE LYMPHATICS.

The lymphatic system is composed of a set of vessels, quite as numerous as the veins, and they ramify through every portion of the body where

blood vessels are found. These lymphatic vessels sooner or later pass into lymphatic glands, which are very numerous in the fore legs and under and between the lower jaws and other parts of the body. The use of these vessels is to collect surplus fluid which exudes through the blood vessels, as well as waste products, and convey them into the circulation. The use of the glands through which these vessels pass is to purify in some way this fluid before it reaches the blood vessels. When the system gets overcharged with these materials, the lymphatics become distended, and in some cases inflamed.

Inflammation of the lymphatics is called Lymphangitis. This disease can be caused by several conditions. First: Horses with a sluggish circulation are predisposed to this disease, animals that are over-fed and have not sufficient exercise or animals that are half-starved and over-worked, sudden exposure to cold and wet. A common cause of this disease is feeding a horse that is idle or that has very little work and too much nutritive food; the system soon gets blocked up, and if the animal does not take an attack of lymphangitis it will suffer in some other form. When a horse is to be idle for a time its allowance of food should be cut down, and if the animal should become reduced, then increase it a little, but a horse allowed to stand eating all day and night is almost sure to suffer some ill effects. On the other hand, when a horse is overworked and under-fed, the whole system becomes weak and the lymphatics are not able to do their

work, and swelling of the legs takes place. It is also the result of disease, especially distemper and influenza, which have a tendency to affect the glands.

Symptoms: It usually begins with a chill and a rise in the temperature, very soon followed by lameness. Often a horse may seem all right at night, and in the morning one or both hind legs will be so sore and stiff that the animal will not move. If only one hind leg is affected, he will hold it up, and if made to move it will not put it to the ground, but hop off on three legs, which often gives the animal the appearance as if its leg was broken. The animal will be breathing fast and heavy, and if made to move may groan with pain; and I have seen some cases where if you rubbed your hand up the inside of the leg the animal would lift it so high as to over-balance and sometimes fall. The glands on the inside of the thigh will be hard and feel like a rope under the fingers, and hot and tender; this will at once let you know the nature of the disease. In the course of a few hours the leg will begin to swell from the foot, caused by a filling up of the lymphatic vessels, and as they become distended they, too, will become inflamed and hot. In some cases the leg will swell to an enormous size, and it may be that the skin may crack or a thin fluid may ooze out. There is considerable fever and a full pulse, from sixty to seventy, and the animal will not eat, but may drink considerable; and if it should lie down, it will be unable to rise until turned over on the well side. A horse

affected with this trouble seldom lies down. Usually the urine is scanty and the bowels constipated. If the inflammation is not relieved in a day or two the glands may undergo suppuration, and blood poisoning may take place, and the animal may die, or the leg may remain thick from obliteration of the lymphatics. This is a disease that is easily treated if taken in time.

Treatment: Find the cause and then treat accordingly. If it is caused by the animal's having too much food and not enough exercise, give aloes one ounce, carbonate of soda one ounce, ginger one ounce; dissolve in half a pint of boiling water, add half a pint of cold water, and give at one dose. Also give twenty to thirty drops of tincture of aconite every two hours until the pulse becomes slower. Also give half an ounce of nitrate of potass. in the drinking water three times a day, bathe the legs with hot water for an hour at a time, then apply acetate of lead half an ounce, tincture of opium two ounces, water one quart. Rub in with the hand. Do this every hour, and keep the animal in a comfortable place. Usually in twenty-four hours the physic has operated and the potassium has increased the secretion of urine, and the hot water and lotion have reduced the inflammation, and the animal can move about with ease. Give gentle exercise two or three times a day for twenty minutes at a time. In cases where it is caused by overworking and poor food, or from reducing diseases, such as influenza and distemper, treatment should be of a stimulating and tonic nature. Give one ounce

each of tincture chloride of iron, tincture of gentian and ginger at a dose in a pint of water three times a day. Give good hay and oats, and apply the above lotion to the swollen legs. In cases, as it sometimes happens, that matter forms in the glands of the thigh, wash with warm water, and use acetate of lead half an ounce, sulphate of zinc half an ounce, carbolic acid half an ounce, water one quart; apply a little twice a day. If the parts should become fungied, apply a little terchloride of antimony with a feather once or twice. In two days use the lotion again. It sometimes happens that the leg from the hock to the foot remains thick, caused either from weakness of the lymphatics or from their being destroyed by the inflammation. In this case it is difficult to remove the chronic swelling. Try arsenic in the form of Fowler's solution in one ounce doses once a day in bran mash, and continue it for a month. Also rub on the leg twice a week iodine two drams, vaseline two ounces. I have seen some cases yield to this treatment. Grease, which is sometimes the result of this disease, will be described under the head of skin diseases.

CHAPTER VII.

DISEASES OF THE URINARY ORGANS.

A short description of the kidneys is necessary so that we may have a better idea of the causes and nature of their diseases. The kidneys are two glandular organs situated in the lumbar region of the back. They are composed of a number of tubes and tufts, around which the blood vessels run. The supply of blood to the kidneys is very large for the size of these organs. The tubes begin very small at the surface of the kidney and are very numerous; they soon join each other, becoming larger, and finally terminate in a part of the kidney termed the pelvis. At the lower border from this place there is a small duct which leads to the bladder, through which the urine passes. The use of the kidneys is to secrete the water and effete matters in the form of urine and uric acid, which would soon poison the body if it remained there. The blood vessels ramify around the tubes, and the epithelium of the tubes secrete the urine from the blood, and if we consider the quantity of urine which is secreted daily, we need not wonder at the size of the blood vessels which go to and from the kidneys. If from want of action, from disease, or otherwise the kidneys did not secrete this material

from the blood, the animal would soon suffer from a form of blood poisoning called uremic. The quantity of urine secreted varies very much in the same animal. The weather has a great deal to do with the amount secreted. Animals pass more urine in winter than in summer, as heat increases the quantity removed by the skin and lessens the amount passed by the kidneys. Work lessens it, as more passes off by the skin. The food the animals eat alters very much the quality and quantity. If animals such as the horse are fed on straw, the urine is usually of a whitish color, if on timothy hay or clover hay usually dark. Thick, creamy urine is the result of a sluggish condition of the kidneys, while coffee colored and scanty urine is the result of fever and a partial congestive state of the secretive organs in different parts of the body. An increase in the quantity and of a clear or light yellow color denotes either over-stimulation or it is seen in cold weather, and on account of it not being irritant the time between voiding it has been prolonged. On the other hand, if it is passed in quantities and often, and the animal is very thirsty, it is a symptom of a disease which will be described hereafter. As long as an animal is in good condition and spirits and has a good appetite no notice need be taken of the urine. Diseases of the urinary organs are very rare in animals, but as they do happen sometimes I will describe a few of them.

Nephritis (Inflammation of the Kidneys).—Inflammation of the kidneys is caused from exposure to cold when the animal is heated, kicks, and other

injuries; also from too strong diuretic medicines, such as resin, saltpetre, and cantharides, and sometimes from the animal eating too astringent vegetables and weeds.

Symptoms: The animal stands with its hind legs wide apart, is stiff, and the back somewhat arched, and if the animal is made to move will groan, has very little inclination to lie down, and if it does it is with great care and does not roll; but it is very seldom that it tries to lie down, as it causes too much pain. The animal may show symptoms of colic pains by looking around at its flanks. The secretions of urine are scanty and high colored, and the animal is constantly passing it in small quantities, or it may be only in drops. On account of it irritating the bladder it is passed as soon as it reaches it. Sometimes after the disease has existed for a few days blood and pus may be passed. The pulse is fast, from eighty to ninety, the mouth is hot and clammy, the bowels constipated, the thirst great, the breathing fast and short, and as the disease advances it becomes very foul smelling. The sweat which will appear on different parts of the body has a strong odor of urine. If the animal is not soon released uremic poisoning takes place, causing exhaustion and sometimes coma. The animal falls, struggles for awhile, and dies. It will assist us to make an exploration of the bladder through the rectum. If it is the kidneys that are at fault, the bladder will be found empty, and by gentle pressure upwards and forwards from the bladder the kidneys can be felt

and the slightest pressure will cause extreme pain to the animal. Pressure on the outside of the back is no sign, as some animals will flinch at the slightest rubbing or pressure, while others will take no notice of it. Examination will disclose kidney casts and sometimes matter.

Treatment: Put the animal in a comfortable place and allow all the cold water it can drink, with two drams of chlorate of potassium in it, three or four times daily. Three-ounce doses liquor acetate of ammonia given several times a day, injections of soap and water to clean out the bowels, and a hot sheepskin put over the loins and kept there by blankets are useful. If the fever and temperature run high give two drams of antifebrin every three hours until sweating takes place and the fever is reduced. After the third day if the urine is very scanty and the breath foul smelling, small doses one to two ounces of sweet spirits of nitre should be given in water and poultices of digitalis powder applied over the loins and kept there until the secretions are increased. One-ounce doses of tincture of chloride of iron given three times a day in a little water is of service.

Hematuria (Blood with the Urine).—This disease affects both horses and cattle. It appears in two forms, idiopathic and traumatic. Traumatic hematuria is caused by strains or injuries. A well-marked case of this kind came to me for treatment. The horse was drawing a load of stones on a tram-car, and on going down an incline the brakes of the car broke, and the car and load went forward on

the horse, knocking it down and bruising it very much over the loins. The horse was gotten up with difficulty and walked very stiff. Shortly after it was noticed to be passing blood with its urine, and passed blood without urine. On the following morning the animal was in a high fever, and passing considerable blood. I ordered cold water to the loins, and gave one dram acetate of lead, one dram powdered opium, and ten drops Fleming's tincture of aconite at a dose every three hours, until four doses were given. The bleeding ceased and the animal seemed better. It was kept quiet and got boiled flaxseed mixed in bran mash, and in two weeks was able to resume its work. There are slighter cases of hematuria, in which the horse is stiff, and when made to move is sore over the loins, and there may be fever and loss of power of the hind legs and the passing of a little blood, which clots on the floor as the urine separates from it. The following prescription will be found of service: Acetate of lead thirty grains, acetate of zinc thirty grains, catechu two drams. Mix and give at one dose in a ball or gruel. Repeat three times a day until checked. Give the animal plenty of cold water to drink and keep it as quiet as possible. In some cases a horse that has had its kidneys injured is very liable to pass blood if it is put to fast work or drawing heavy loads, and is unsound.

Idiopathic Hematuria is a disease observed under a great variety of circumstances. It occurs among horses, cattle and sheep, as an enzootic dis-

ease, and it is remarkable that there are districts where the disease prevails among horses. There are others where it prevails among cattle of all kinds, male and female, and there are still others when it affects only cows after parturition. (Gamgee.)

Symptoms: There is a copious discharge of dark or red-colored urine and it does not separate into clots on the floor, the blood having been broken up in the system before being passed. The animal moves stiff and is weak on its hind legs. The pulse is fast, from seventy to eighty, and there is a loss of appetite. As the disease advances the animal becomes weaker, the breathing difficult, and with a few convulsive struggles it dies.

Treatment consists of giving the horse one ounce aloes and one ounce ginger dissolved in hot water. Follow this by giving one ounce tincture of chloride of iron, one ounce tincture of ginger, and one ounce tincture of gentian at a dose three times a day in a half pint of water. Boiled flaxseed mixed with bran is useful if the animal will take it. Give plenty of cold water, and allow the animal anything it will eat. The same treatment is good for cattle; but give Epsom salts instead of aloes to cattle and sheep—one and one-half pounds for cattle and one-quarter pound for sheep at a dose.

Polyuria (Diuresis Polyuria Diabetes Insipidus).—This disease is characterized by frequent and abundant discharge of urine. The cause of this disease is not well understood, but it usually follows wet seasons, when the hay, straw and oats

have been exposed to rains and are more or less musty. Musty hay, straw or grains of any kind, if fed to animals, are very apt to set up some disorder, either of the stomach or kidneys. The symptoms of the disease are intense thirst; passing great quantities of water of a clear color, as there is very little salts or coloring matter in it; the appetite is depraved, the animal will lick the plaster off the wall, or eat earth or dirt; the animal becomes rapidly emaciated, and will soon die from exhaustion if the disease is not stopped.

Treatment: Iodine is a specific in this disease; it is given in dram doses. First dissolve in a little alcohol, then add one-half pint of water or give it in a ball. Give it three times a day. Usually two or three doses will stop it. Follow this up by giving one dram sulphate of iron in the morning and a teaspoonful of phosphate of calcium in the evening in bran mash. Continue this for three weeks.

Ischuria (Suppression of Urine).—When there is a stoppage or very scanty passage of urine it will be necessary to find the cause of the stoppage, whether it is the kidneys which are not secreting urine, or if it is a stopping up of the passages. Clean out the rectum, then oil the hand and pass it into the rectum and feel for the bladder, which will be felt below the bowel about eight or ten inches in from the entrance. If the bladder is full it can be easily felt. If it is empty, you cannot feel it. If it is empty, the kidneys are at fault. It is then termed ischuria. Suppression is caused by over-stimulation of the kidneys or feeding innu-

tritious food. Nephritis is especially due to an overdose of cantharides. In fevers also the urine often becomes scanty and acid. It is then irritating, and is passed off in drops or small quantities. If there is true suppression of urine, symptoms of blood poisoning will occur, as the elements of the urine are retained in the blood. We also find sluggishness of the kidneys in old horses, especially if overworked. The urine passed may be either of a red-brown color or of a thick, milky appearance.

Treatment: If it is caused from fevers, give nitrate of potassium in half-ounce doses three times a day in the drinking water. If it is causing much irritation of the bladder and other passages, give two ounces spirits of nitric ether and one ounce buchu tincture. Mix and give in half a pint of cold water three times a day. If in old, worn-out horses, give sulphate of iron, two ounces; nitrate of potass., two ounces; powdered digitalis, one ounce; mix and divide into twelve doses, one to be given twice a day in bran mash. In all cases feed good hay and oats. Atrophy and hypertrophy of kidneys are occasionally found in both horses and cattle. It is often found that when one kidney is affected with atrophy the other most likely will become hypertrophied and it will be found twice its natural size. Atrophy of the kidneys is often found in the pig, and it is mentioned by Gamgee that one kidney has been absent, and its fibrous capsule alone remaining, distended by a yellow fluid of a strong urinous odor, whereas its fellow was very much enlarged and the animals were in

good health. Hypertrophy is a common disease in cattle and is met with in some of the finest and fattest oxen. Cases are recorded in which the kidneys have weighed twenty-four to twenty-seven pounds. When they attain this condition the animal becomes unhealthy and loses flesh and soon dies. There are no well-marked symptoms by which atrophy and hypertrophy can be detected until after death.

Worms in Kidneys.—This is said to be a disease of the hog; but worms have been found in the kidneys of the dog. I remember a case of a dog used for dissection, which was in perfect health, and in one of its kidneys I found three worms about one inch in length and the color of the kidney. They were alive. They are frequently found in the kidney and liver of pigs which are in good health and condition, and I do not know of any case in which they destroyed any animal. The disease which is called kidney-worm in the hog is a deranged condition of the nerves of the back and loins, causing them to lose the use of their hind parts. If they were affected by the worms the symptoms would be those of kidney disease and not of paralysis.

Cystitis (Inflammation of the Bladder).—This is a very rare disease in the domestic animals, and when it is present it is usually caused by giving the animal too strong diuretics, such as cantharides; injuries, irritating urine, and sometimes from inflammation of the surrounding parts. Inflammation may involve the whole of the organ or only part. The neck is the part usually affected.

Symptoms: There is retention of urine, as the bladder does not contract, and therefore the water is not expelled. The animal suffers pain and is in great distress, is stiff in its movements, pokes its nose between its legs, and shows symptoms of colic, but seldom lies down. There is a loss of appetite, the mouth is dry and red, and there is fever; pulse from eighty to a hundred in the ox, and from seventy to eighty in the horse. The urine may be passed in small quantities and will be thick and high colored. At first the animal is much excited, and if not soon relieved great prostration supervenes. Cold sweats bedew the body; there is trembling of the muscles, paralysis of the hind legs, and the animal dies.

Treatment: Clean out the rectum, then oil the hand and feel for the bladder; the animal evinces pain when the part is pressed upon, and the bladder is hot, and in some cases distended with urine. In this case the first thing to do is to pass the catheter to remove the urine; this will give the animal great relief. Give a dose of raw linseed oil, from a pint to a quart, according to the size of the animal. Give the animal all the water it will drink; half an ounce of gum arabic dissolved in the pail of water is very useful. Use hot fomentations to the back part of the abdomen. If there is much fever give twenty to twenty-five drops of tincture of aconite every two hours in a little cold water. If there is great suffering give powdered opium in dram doses every three hours until relieved. Also inject through the catheter infusion

of opium three or four times a day. Keep the animal warm and as comfortable as possible

Retention of Urine.—The causes are numerous. Hertwig mentions, first, inflammation of the neck of the bladder or of the urethra; second, paralysis of bladder or spasms of its neck; third, stones in the bladder or a polypus in the neck of the bladder; fourth, stones in the urinary passage; fifth, contraction of the passage; sixth, obstructions at the mouth of the opening, and in some few cases from an accumulation of mucous in the passage. I remember having a well-marked case of this kind in an old horse which was troubled with albuminous urine: one morning the animal was in great distress, stretching out and making ineffectual attempts to pass urine, showing signs of colic, lying down carefully, getting up again, and in a continuous state of unrest. I was called to see the animal, and in looking it over I discovered a lump on the urethra a little below the root of the tail, and on feeling it, it was soft; I pressed it up and down for a few minutes, when it finally gave away, and the next minute the animal passed off a large quantity of urine and was at once relieved. The general symptoms of this trouble are: The animal makes ineffectual attempts to pass urine and shows signs of pain, kicks with its hind feet, lies down very carefully, but soon gets up again. The method of finding the true nature of the disease is to examine the track of the passage to see if there is any external obstruction; if none is found, then clean out the rectum and introduce your hand,

well oiled; if there is retention, the bladder will be easily felt greatly distended, and sometimes gentle pressure of the hand will cause the urine to pass out and relieve the animal. If this cannot be done, then it will be necessary to pass up the catheter until you come to the obstruction. The obstruction is sometimes found to be caused by the deposit of a putty-like substance, which can easily be removed by breaking down with the finger. If this substance should remain in long it would harden into stone, and in some cases it does this and the urine passes through an opening in its center or on one side, and by degrees it closes the passage. I have met with several cases of this kind. They can usually be removed by a pair of forceps or may be pressed out. If this cannot be done, make an incision at one side, then it can be removed by the finger. If the obstruction is found further up the passage and cannot be broken down by the catheter it will be necessary to cut down upon it with the knife and remove it, then pass through the edges of the wound a small pin on which is tied a small piece of string in the form of a figure eight; this will close the wound. Let the pin remain in until it sloughs out. If the catheter reaches the neck of the bladder and stops there, do not press too hard, but give a little time for the part to dilate; if this does not take place in a few minutes, withdraw the catheter and smear the end of it with a little extract of belladonna and press it up to the neck and allow a little time for it to take effect. If you do not succeed in this way,

give the animal one ounce of chloroform in half a pint of raw linseed oil. Introduce the catheter with a little more belladonna on it. Also inject large quantities of hot water into the rectum, and after an hour's time the neck will usually relax and the catheter will pass in, or the urine may flow out. If it does not relax, it will then be necessary to use considerable pressure on the catheter. Never give horses medicine to act on the kidneys when there is retention of urine before you make an examination and find the cause, as great injury may be done by causing an increase of urine into an over-distended bladder. In the ox the catheter cannot be passed as in the horse. The course of the urethra must be traced and an incision made into it about four inches down from the root of the tail, then pass the catheter through the incision in the bladder and the urine will flow out. The wound should be closed by pins or stitches, as before mentioned.

Paralysis of the Bladder.—Paralysis of the bladder is a cause of retention, and is best treated by giving the animal nux vomica, two ounces; sulphate of iron, four ounces; divide into twenty-four doses and give the animal one twice daily in its food, meantime removing the urine by the catheter. The result of over-distention of the bladder is paralysis of its walls or rupture. The first may be cured by giving the above medicine, the latter is always fatal. I have seen only one case of rupture.

Enuresis.—Incontinence of urine consists of a

dribbling of urine, usually caused by a relaxed state of the neck of the bladder and sometimes from irritability of the bladder, as in certain disorders of its lining membrane or from calculi, and when the urine is very scanty and acid.

Treatment: Find the cause. If it is caused by relaxation, give the animal one dram of the fluid extract of nux vomica three times a day; also one ounce tincture of chloride of iron; these can be given together in a pint of gruel or linseed tea. If it is from calculi, it will have to be removed; if from irritation, inject a solution of gum arabic in which half an ounce of tincture of opium has been mixed. If from too scanty or acid urine, give nitrate of potass. in one-half ounce doses, mixed with half an ounce buchu extract, three times daily in a pint of water. Incontinence of urine is sometimes seen in foals from nonclosure of the urachus, a tube which leads from the base of the bladder to the navel cord, and the urine is seen to drop or run from it. The best remedy for this is to plaster plenty of prepared chalk on the navel as often as necessary. This will dry up the cord and cause it to contract and by degrees stop the passage of urine in that direction. It is bad practice to tie the cord to stop it, as it is almost sure to set up inflammation and kill the colt.

Inversion of the bladder is seen in the female animal, and is due to violent straining, although it has been seen to follow the administration of irritant medicine. The symptoms are a red tumor projecting from the

vulva, and having the urine constantly dropping from it. If it is not put back in its place, the urine will excoriate the parts and they will swell to such a degree that replacing is impossible, and it will be better to destroy the animal. Before replacing it bathe it for twenty minutes with acetate of lead two drams, tincture of opium one ounce, water one pint. Then press gently on its center with the fingers and it will return easily. The animal should get two drams of powdered opium in a pint of gruel and should be watched, as it is liable to be pressed out again.

Calculi.—There is a tendency in some animals, from a condition of the urine, to deposit solid material in some part of the urinary organs. This tendency cannot be accounted for. I have seen a number of horses and cattle kept on the same farm, getting the same food, water and care; one of the lot becomes affected with a deposit, while the rest remain exempt. We have no means, therefore, of preventing it. It is said by some to be caused by clover hay and water that contains too much lime, but in my practice I have not seen any more cases in those fed largely on clover or in those whose drinking water was largely impregnated with lime. So we will have to put it down to a peculiar condition of the body of the animal to form the substances necessary for the formation of calculi. Gravel is the name given to this derangement when the deposit is in small crystalline form like sand. This form is oftenest seen in the mare. When it is in a solid, hard body it is called a stone (calculus).

There is also sometimes a deposit of a softer nature resembling putty. The following is the average analysis of the calculi of the horse:

Carbonate of lime, 85.03; carbonate of magnesia, 3.62; phosphate of lime, 5.81; organic matter, 4.21; water and loss, 1.33; total, 100.00.

In cattle: Carbonate of lime, 84.8; carbonate of magnesia, 10.00; carbonate of iron, 0.6; organic matter, 1.6; water and loss, 3.00; silicic acid inconsistent, 100.00.

In the horse and ox carbonate of lime is present in the urine at all times; but if from some cause there is an excess of it in the urine it is liable to be deposited and form into a stone or gravel.

Symptoms: In the horse and ox there is stiffness in the hind legs, switching of the tail, a frequent desire to pass urine indicated by the animal stretching out; the ox does not stretch out, but will kick its belly with its foot; at times the urine will pass easy, when all at once it will stop, and all attempts at further passage are in vain; the animal may sigh, or even groan, or may lie down. The stoppage is caused by the stone pressing for the time being against the neck of the bladder, thus preventing the passage of the urine. After the animal is moved the stone may pass back into the body of the bladder and not trouble the animal for some time; but usually the straining in passing the urine forces the stone against the neck of the bladder, and every time the animal passes urine it will be troubled in the same way as mentioned above. This may continue for a long time, not

seeming to affect the animal's health. In some cases of gravel in the mare and horse there will be incontinence of urine, excoriating the skin of thighs and legs, making them inflame and swell, causing the animal to go lame. When animals show the above symptoms it will be necessary to make an examination to ascertain the true nature of the trouble. This is done per rectum in the horse and ox and per vagina in the mare and cow. First empty the rectum by injections of warm water. The time selected should be, if possible, after the animal has urinated; if this is not practicable, use the catheter, as it is much easier to detect the stone when the bladder is empty; oil the hand and introduce it into the rectum or vagina. After passing the hand in eight to twelve inches, under the lower surface of the rectum the stone can be easily felt if present as a hard lump; if none is present it will be smooth and soft, so no mistake need be made.

Treatment: When a stone is found, in the majority of cases it ought to be removed. This may be done in the mare without cutting the urethra. The hand is oiled and introduced into the vagina at a distance of four inches; on its floor will be found the opening into the bladder. It is covered by a flap of membrane, which is easily lifted up with the finger. The forefinger is passed into this opening and kept there; a pair of spoon forceps, warmed and oiled, is then passed by the other hand into the opening under the finger, which is withdrawn as soon as the forceps enter the opening; the blades

of the forceps are opened and closed for the purpose of dilating the opening; when this is accomplished and the forceps have reached the stone, which is easily known by the sound of the forceps against it, the right hand is now passed either into the vagina or rectum and the stone guided into the forceps, which should then be closed firmly on the stone and gently withdrawn with a slight rotary motion. If the stone is too large it will require to be crushed. The opening or urethra in the mare is much larger than in the horse, and by degrees it can be dilated to a considerable size. In one case of a mare, which was troubled by deposits of the soft gravel, large quantities of it would form in the bladder in a few months. In this case I had no trouble in dilating the opening large enough to admit a large tablespoon, which I used to scoop out the material which had accumulated; sometimes as much as a pint was removed at once. The operation on the horse is much more difficult. The instruments needed are a catheter, a pair of spoon forceps, a grooved director and a probe-pointed knife, a sponge, needles and catgut. Cast the horse, and if possible put it under the influence of chloroform, then pass the catheter and turn the horse on its back; make an incision about two inches long through urethra onto the catheter, withdraw the catheter, and introduce a pair of long forceps, not too large (warm them and oil before using them); then open and close the blades for a few minutes to dilate the urethra, introduce the spoon

forceps, warmed and oiled, press these in until the stone is touched; introduce the right hand into the rectum, and guide the stone between the blades of the forceps, grasp the handles firmly, and by a rotary motion try and extract it. If this cannot be done withdraw the forceps, introduce the grooved director, and run the probe-pointed knife along the groove of the director; then make one free incision through the urethra, introduce the forceps and remove the stone. The bladder should be washed out with warm water, the wound cleaned and the edges brought together by a few stitches with catgut. The part should then be bathed with acetate of lead one dram, tincture of opium one ounce, water half a pint. If the animal is suffering much pain give one to two drams of powdered opium made into a ball. If much swelling takes place bathe it frequently with the above lotion. Sometimes the urine infiltrates into the tissue between the skin and flesh, setting up great inflammation, causing the death of the animal.

Lithotomy in the ox: The catheter cannot be introduced into the urethra of the ox, and the removal of a stone from the bladder can only be done by cutting on the urethra. This is done by cutting through the skin about two inches below the anus and exposing the urethra and cutting through it. The remainder of the treatment is the same as in the horse.

Urethral Calculi.—These stones are formed sometimes in the fossa or cavity in the point of the yard. When present they give rise to a stoppage

or partial stoppage of the water. First examine the cavity in the end, then run the fingers along the back part of the yard, and if there is any obstruction it can be easily felt. In the end it can usually be removed with the fingers. If this cannot be done try the forceps. If it is too large to be removed through the opening slit it and then the stone can be easily pressed out. If it is up in the urethra cut down upon it and remove it, then pass a small pin through the lips of the wound and tie a piece of thread in the form of the figure eight; this will bring the edges of the wound together. Then cut off the sharp end of the pin and let it remain in until it sloughs off, and usually by that time it will be healed. If it should slough off too soon put in another pin in the same way. If the edges of the wound are dry scarify them before inserting the pin.

Preputial Calculi.—This form of calculi is found in the sheath, usually in the ox or steer, seldom in the bull. I was called to a well-marked case of this trouble, which I will give as an illustration. The patient was a three-year-old steer which was noticed for some time to have a swelling at the end of the sheath, which gradually increased in size. One day the animal seemed to move stiff and refused its food, and would not move unless it was made to. When I saw the animal it was standing with its back arched, breathing faster than natural; the nose was dry and the animal seemed to be in distress. I noticed that the sheath was swollen its entire length, and on examination I also

found the lymphatics on the inside of the legs were hard and swollen. Inside the point of the sheath I found a large accumulation of the limy deposit adhering to the sides of the sheath, almost closing it up, and from some cause had set up inflammation of the sheath, causing the animal to be feverish. I had the animal tied up by the head and a strong strap buckled around its hind pasterns, so that it could not kick. I then tried to remove it with my fingers, but found it was too hard. I then used a strong pair of forceps, and broke it off piece by piece, until I finally removed it altogether, but it left the walls of the sheath raw and sore. I washed it out with warm water, then applied to its walls a little of the following: Glycerine two ounces, tincture of opium one ounce, tannic acid two drams, sweet oil two ounces; this was mixed and well shaken before using. It is best put on with a swab or mop once a day. The outside of the sheath was bathed with warm water and some lead lotion applied. The animal got one and one-half pounds Epsom salts, and the next day was much better, and in ten days was quite well. These cases ought to be looked to early. As soon as any swelling is noticed, the animal should be examined, and if need be attended to as above, as it would save time and suffering to the animal.

CHAPTER VIII.

DISEASES OF THE SKIN.

The skin on the animal's body serves as a protection to the soft structures beneath it; also to prevent noxious materials from passing into the body, and allows the escape of waste materials from the body. This is constantly going on. If from disease or other causes these pores become stopped up the animal soon suffers from the effete matters being penned up in the system. It is therefore of the greatest importance to keep the skin of animals clean and healthy. It is said that good grooming is worth half the food; and there is a great deal in it, as it prevents disease of the skin and keeps off vermin.

"Hidebound" is not a disease, but the result of disease, or the want of proper food and shelter. The skin becomes dry on account of the secretions being stopped, and the nerves of the skin being in a disordered condition, causing the hair to stand erect. An animal that is fat and in good health is never hidebound.

We will divide the diseases of the skin into two sections, the non-parasitic and the parasitic. There are a great many names given to the non-parasitic diseases, but they are very conflicting, and for our

purpose we will only separate the ones which require a different treatment.

The word Eczema is applied to a number of diseases. We will apply it to a disease characterized by a redness, followed by the surface of the skin presenting a number of little vesicles or blisters, from which exudes an acrid fluid, which concretes on the hair in a yellow crust, and in some cases the hair drops out. A peculiarity of this form of disease is that it is recurrent, and in this way it may last for a long time if not remedied. In some cases the skin may crack, and in others it may lead to a thickening.

Treatment: In the early stage give the animal a physic: Aloes one ounce, ginger one ounce, soda carbonate one ounce, dissolve in half a pint of boiling water, then add half a pint of cold water, and give at one dose. For cattle give from one to one and one-half pounds Epsom salts, and one ounce ground ginger dissolved in half a gallon of water, at one dose. Follow this with sulphate of iron four ounces, nitrate of potass. four ounces, divide into twenty-four doses, one to be given in a small mash of bran twice daily. Wash the skin with one ounce of carbonate of potassium dissolved in a quart of water; rub this well in; then use warm water to wash it off. Keep the animal warm until dry. If there is much itching wash the itchy parts with acetate of lead half an ounce, tincture of opium two ounces, water one quart. For chronic cases give one ounce of Fowler's solution of arsenic in a bran mash and continue it for a

month. Wash the skin as above. If the skin should become thick and scaly use biniodide of mercury two drams, vaseline four ounces. Rub on a little with the fingers. Never cover over much surface at a time. For example, if the neck is the part affected, take one side at a time, and in three days take the other side, and so on in other parts of the body until you get all over the animal if necessary. One application is usually all that is needed; but if it should not cure it, repeat in two weeks. Tie the head of the animal so that it cannot get its mouth to the part for the first ten or twelve hours; after that the irritation will be over. This is a fine remedy if properly used.

Urticaria, Nettle Rash, Surfeit.—The symptoms are sudden appearance of elastic patches or prominences on the skin, accompanied by great itching of the part, and it may pass off as suddenly as it appeared. There is a second variety of this disease, in which the lumps may arise on every part of the body, some large, others small, and if they do not pass off soon, may form vesicles and discharge a glutinous fluid, and the animal may appear dull, the appetite may be impaired and the animal's health disturbed. This disease may make its appearance on any horse, but it is usually caused by the animal being overfed and having no exercise, or from the animal's being poorly fed and over-worked. In the spring I have seen it in colts which had been poorly fed all winter.

Treatment: If the animal is fat give the same dose as recommended for eczema; if the animal is

thin give good hay and oats, boiled flaxseed and bran once daily. Give sulphate of iron four ounces, nitrate of potassium four ounces, nux vomica two ounces, mix and divide into twenty-four doses, one to be given twice daily in the food. If the skin is itchy use lead and opium as in eczema. After giving this, if the animal is not cured, give arsenic in the form of Fowler's solution in ounce doses once daily in food for a month.

Lichen.—This consists of pimples on the skin about the size of a millet seed. They develop principally around the hair follicles in patches. The hair falls off and the skin remains bare for five or six weeks, when a layer of scales drops off, and then the hair begins to grow. The malady is apt to recur. All that is necessary in this case is to keep the skin clean by good grooming and give a tablespoonful of sulphur and half an ounce of nitrate of potassium once a day in mash.

Pimphigus.—This is a disease of the skin characterized by bladders or elevations of the scarf skin, varying from the size of a walnut to a hen's egg. A thin transparent fluid oozes from them, and when large and opened it will run out in a stream. In some cases the animal may be fevered, but usually it is not. The disease runs its course in a week or ten days. The hair may drop out where the lumps were and be some time in coming in.

Treatment: Give a physic of aloes to the horse and salts to the ox, open the vesicles and dress with oxide of zinc one ounce, vaseline three ounces.

Prurigo.—This disease is caused by a deranged state of the system and usually affects the neck, head, mane, root of tail, and sometimes the hind quarters.

Treatment: Give a dose of physic or bran mashes with nitrate of potassium in half-ounce doses twice daily for a week. Wash the affected parts with one ounce of sulphuric acid mixed in a quart of water.

Acne.—This is a formation of pimples or small abscesses, which form on the skin, usually scattered over the sides of the body and under the belly. In cows usually on the udder and inside the thighs. In some cases they break and discharge a little matter; they then dry up and soon heal.

Treatment: Give a dose of physic followed by Fowler's solution of arsenic in ounce doses once daily in mash. If there are any sores use a little oxide of zinc ointment.

Pityriasis.—This is a scurfy condition of the skin usually seen in horses which have been wintered out of doors and fed on innutritious food. Change the food and give boiled flaxseed and a dram of sulphate of iron night and morning in bran mash.

Alopecia (Baldness).—In the horse this is usually the result of applying too irritating substances to the skin, such as the strong acids, using blisters on the same part before it has healed from the effects of the first one, and from wounds not properly treated. When the hair bulb, or root, which is situated beneath the skin, is destroyed, the hair

drops out, leaving the skin bare, and as there is no root the hair cannot grow, neither is there any medicine that will cause it to grow. In some cases the hair may drop out from fever or inflammation of the tissue under the skin affecting the hair bulb, but not destroying it. In this case it will grow again, and may be helped by applying friction and a little tincture of cantharides to it every third day.

Warts.—The cause of this derangement is not well understood, but is supposed to be caused by an altered state of the cells of the skin, taking on this form of growth. When a wart is irritated by rubbing it may take on the form of an ugly fungus-like mass and bleed on the slightest pressure. They occur very frequently about the head and face, but may come on any part of the body.

Treatment: On all those which have a neck tie a small cord tightly around them, and if they do not slough off in a week tie another cord. When they slough off apply a little terchloride of antimony to the raw spots to destroy the roots. This can be repeated every third day. Usually two applications are enough. In cases where they are flat, scrape off the surface with a blunt knife, and when they stop bleeding apply a little of the terchloride of antimony with a feather. Scrape the scab off in three days and apply a little more, and so on until it is lower than the surrounding skin. Then use oxide of zinc one ounce, lard two ounces. Apply a little once a day until it is healed. These warts can be removed with the knife, and the caustic applied, but I find that the plan given above is the

best. There is a form of warts which appear suddenly on the lips and nose of young colts and calves, and sometimes on older animals. These are small, and the whole lip will be covered with them. They sometimes occur on the inside of the lip of the dog. They require no treatment, and will often disappear as suddenly as they came.

Emphysema (Air Under the Skin).—This is usually the result of a wound, where the skin is loosely connected with the muscles, as behind the elbow or lower part of the neck. There is a peculiar crackling beneath the skin when the pressure is brought to bear upon the part. In the majority of cases it requires no interference, as it will soon pass away. In bad cases the skin may be punctured and gentle friction applied.

Mange.—This is a contagious disease caused by a parasite.

Causation: Although it is undoubted that the essential and immediate factor in the production of mange in any form is the presence of the mange mite, we may not shut our eyes to the teachings of experience, in so far as that these tell us that all debilitating and exhausting influences, as exposure, fatigue, want of sufficient food, and fitting stabling render animals more susceptible to the attack and rapid development of the inducing parasite, and of course materially influence the progress and termination of the disease. The influences of these agencies have been observed and their extent determined by all observers, particularly by those associated with large collections of

animals in civil as well as military life. In the latter condition this disease, along with glanders, has ever been the scourge of armies in the field. (Robertson.)

Symptoms: Mange in the horse and ox usually begins in the neck, withers, and root of tail. From these parts the disease extends and passes through its various stages, which are first characterized by round, irritable patches. During this stage there is intense itching, and from the vesicles which appear there oozes a watery fluid, which soon dries, forming a scab. The hair drops out, and on account of the animal rubbing and biting itself the part is left raw and sore and the skin swollen and red. In the chronic stage there is not so much itching. In the dog it begins on the inside of the legs and scrotum, and soon spreads to the back. As mange in its various forms resembles other eruptive diseases of the skin it is first necessary to look for the parasite, which can be done by a magnifying glass, also tracing the origin of the contagion. In some cases the parasite can be seen with the naked eye in the glare of the sunlight.

In the treatment of mange we must destroy the parasites. It is also necessary to destroy the eggs, which require stronger remedies than would kill the parasites. The eggs are concealed under the scales, or scabs, and are difficult to get at. First wash the affected parts with soft soap and water, using a brush to remove or break down as many of the scabs as possible. Boil stavesacre seeds, one part to twenty parts of water, for one hour, and let

it simmer for another hour. Then add water to make it up to the original bulk. Apply a little of this to all the affected parts. Repeat in a week if necessary. Sulphur half a pound, vaseline one ounce, mixed and rubbed in well, is also a good remedy. Another, than which there is nothing better, is linseed oil one pint, oil of tar two ounces, sulphur two ounces, mixed, well rubbed in two days in succession, allowed to remain for three or four days, and then washed off with soap and water and reapplied if thought necessary. Sanitas oil is the safest and best to apply to mange on dogs, as there is no danger of poisoning with it.

Lousiness.—This is a very common trouble in horses and cattle, and is best treated by the use of stavesacre seeds as recommended for mange. Another good remedy is to boil for one hour two ounces of arsenic, two ounces of soda ash, and four ounces of soft soap and two gallons of water. Add water to make it up to the two gallons. When cool wet the animal all over with a little of it, using a currycomb to get it into the skin. Keep the animal in the stable until dry.

Tinea Favosa (Ringworm).—This is a common disease in young cattle, affecting them around the eyes and legs.

Symptoms: The appearance of a white or grayish scurf and the hair dropping off.

Treatment: Scrape off the scurf with a blunt knife, then paint it with tincture of iodine every third day until four applications have been used.

Scalds and Burns.—Superficial scalds or burns

cause a redness of the skin, and if deep enough will cause the hair to drop out, or cause absorption of the pigment, which gives color to the hair, and it may never be reproduced. In that case the hair over the part will remain white. This often takes place from scalds by the harness rubbing on the skin when the animal is hot. There is no remedy for it. When a burn is deep it will inflame, and as a result matter will form, and if properly treated will heal without leaving any blemish. First protect the part from the air by applying bicarbonate of soda to it, or by painting it over with collodion. If matter forms wash it carefully and apply acetate of lead half an ounce, zinc sulphate half an ounce, water one quart. Apply a little twice a day. If there is any proud flesh it should be kept down by applying a little terchloride of antimony. Keep the center lower than the surounding parts, so that the edges will grow close together, and when it heals the hair will cover it and leave no blemish.

Grease.—This is a form of eczema which is frequently seen in horses, affecting the skin of the fetlock and heels. There are two forms of this disease, of which one is very common in the draft stallion. The first symptom that is noticed is the appearance of a dry, scurfy material at the roots of the long hair of the fetlock; by degrees this accumulates into bunches and can be seen through the hair; then in some cases there will be cracks through the skin, and if the animal is exercised they may bleed, and if not treated they will increase until they become unsightly blem-

ishes. This disease is caused by a filling up of the lymphatic vessels with fluid, and a little of it oozes out through the skin, forming a crust, and the skin under it gradually becomes sore; and a morbid growth of cells, which should have formed the scarf skin, forms into bunches, which become hard, although there are blood vessels in the lumps, and in this way they develop.

Treatment: In the early stage apply a poultice of linseed meal, changing it twice a day until the scurfy part is clean, then rub on once daily oxide of zinc one ounce, vaseline two ounces. If there is any tendency for scurf to form, apply the poultice again. Give the horse a dose of physic; aloes is the best, and when the physic operates give one of the following powders once a day in bran mash: Sulphate of iron four ounces, nitrate of potassium four ounces, mix and divide into twenty-four doses. Give regular exercise and do not feed much corn. In cases where bunches have formed remove them either by twisting them off with the fingers or cutting them off with the knife or the hot iron. This is best done by taking two shovels (fire), and heating one of them red hot, and putting the cold one between the skin and the hot one, and by using a little pressure on the hot shovel it will cut off the bunch. When they are cut off by this method no caustic is needed, but when twisted off or removed by the knife the raw parts should be touched with a little terchloride of antimony once. Then in all cases to heal them use the oxide of zinc ointment once daily. There is another form of

grease in which pustules form, yielding a foetid discharge. In some cases the legs swell before the pustules form, and there may be some fever. The hind legs are the ones usually affected. The discharge is sometimes very profuse, wetting the back of the hoofs; and if the animal stands for some time the floor beneath the feet will be wet. The discharge of grease is very irritating, and will destroy the parts over which it flows. This causes the skin to crack and become sore, and proud flesh may form with a crust on top, which, if peeled off, will bleed freely. In some cases this greasy substance will burrow between the horny and the sensitive frog, making it a very difficult case to treat. Professor Hering has found in chronic grease a large number of acari called "sarcoptes hippopodus," which cause great itching, and the animal bites and rubs the parts. To prevent this, if the horse has a tendency to swell in the leg, that should be remedied as soon as possible in case it should take on this form. The horse should have regular exercise and not too much food, and if the legs should swell, give a dose of physic, followed by tonics. Some breeds of horses seem to be predisposed to grease. The heavy, coarse-limbed animals, with hairy legs, are more often affected with this disease than others. Poultice the parts to clean and soften them. Remove all the scabs, and if there are bunches of fungoid granulations they will have to be removed by caustic, or the hot iron. After this is done take one ounce of carbolic acid and six ounces of water, shake it up well and apply

a little to all the sore parts. This strength will turn the parts white and will kill the acari. In two days after using the carbolic acid use acetate of lead half an ounce, sulphate of zinc half an ounce, water one quart. Apply a little twice a day. Use the carbolic acid again if the parts are not healthy. If it has burrowed between the horny and sensitive frog cut away all the loose horn and use the above treatment. Give the horse one ounce of Fowler's solution of arsenic once a day in bran mash.

Scratches or Cracked Heels in Horses.—This is a trouble more often seen in the race and trotting horse than in the draft. One of the causes of it in the fast horse is the sweat running down the legs and lodging in the hollow of the heel, irritating the tender skin, causing it to become dry and crack. This can be avoided by rubbing the heels dry and then putting on a little vaseline. This should be done the first thing, when the horse is taken to the stable. Wet and cold and cold draughts coming under a door and striking on the heels are frequent causes. In all cases of scratches poultice the heels for a few days to remove the soreness and inflammation, then use the oxide of zinc ointment, and give the animal half an ounce of nitrate of potassium once a day in bran mash, and in a few days they will heal. There is a chronic form of scratches I have been called upon to treat in which all kinds of medicines have been tried and the parts seem to be healed, but as soon as the horse is driven a short distance the skin cracks open and blood

oozes out. There is only one remedy which I have found to be of any use. Take biniodide of mercury two drams, vaseline three ounces. Mix and rub on a little of this. Let it remain on for twenty-four hours, then wash off, and rub on a little lard. In a week, or when it is well from the effects of the first, rub on a little more, and so on for two months. By this time the ointment will have absorbed the thickened skin, leaving a thin, soft, pliable, healthy skin, which will not crack. It usually takes from two to three months to accomplish this.

Ringworm (Tinea Tonsurous).—This is common in the domestic animals, especially in calves and young cattle, and is contagious. It depends upon the presence of a vegetable parasite, which develops and grows rapidly when it finds a suitable place for development. It may affect any part of the body, but its favorable seat is the face, ears and neck of cattle, and sometimes the back and hind quarters.

Symptoms: There appears a gray crust on the skin, and the hair drops out. This keeps spreading in the form of a ring until the side of the face, ears or neck may be covered with it. It appears in the same way on the back, hips, and inside of the hind legs. It does not seem to affect the health of the animal, as it is found in the well-kept as well as the unkept.

Treatment: First remove the crusts by washing the parts with warm water in which one ounce of the carbonate of potassium has been put to every

quart of water. A brush should be used to wash with. Then use iodine two drams, vaseline two ounces, and rub a little of this on with a gloved hand. Repeat in three days. Or take carbolic acid one ounce, alcohol two ounces, and apply a little of this to the parts with a feather once or twice; the last is very effective.

CHAPTER IX.

TUMORS.

Fibrous tumors are sometimes seen in horses, and are due to pus imprisoned in the muscles, and are very frequently found on or near the point of the shoulder, and arise from pressure of the collar. They are found on other parts of the body liable to pressure. They are hard to the touch and not painful on pressure. The best method of treating a tumor of this kind is to make one or two openings into the center of it, and when it stops bleeding take two grains of bichloride of mercury and roll it up in a small piece of tissue paper and press it into the bottom of the opening. Repeat this every third day until the tumor disappears, which it will soon do, leaving no blemish. I have practiced this method for a number of years with success.

Cystic tumors are usually caused by bruises or pressure. Thus we find capped elbow and capped hock.

Capped Elbow is caused by the horse lying on its foot or the calkins of its shoe, and from this pressure in time a low form of inflammation is set up and a fluid is poured into the bruised part, and it gradually increases until a tumor, or what is called a shoe boil, is formed. When it gets into this state

it is difficult to cure,as there is no flesh on the point of the elbow to build upon. The fluid accumulates between the skin and the point of the elbow.

Treatment: Open it and allow the fluid to run out. If it is hot and tender bathe it three or four times a day with acetate of lead half an ounce, water one quart. Inject a little of this into the opening and muffle the horse's foot by putting on a bag stuffed with short straw. There is a tendency for the skin and tissue to thicken and in time form a hard tumor. In this case make an opening into it and inject a little tincture of iodine once a day and rub iodine ointment on the outside twice a week; one part of iodine to eight parts of lard is the best strength for this. Continue this treatment for a month or two. Cutting it out with the knife, I find, is bad practice, as in the majority of cases before it heals the tumor will be larger than before.

Capped Hock is caused either from kicks or bruises. It sets up an inflammation, resulting in effusion between the cap and the point of the bone of the hock, and if an opening is made into it, it usually makes a worse blemish than the enlargement, and is best treated at first with acetate of lead half an ounce, water one quart. After all heat and tenderness are gone use biniodide of mercury one dram, lard one and one-half ounces; rub on a little once a week, and continue it for several months. There are cysts which form on the stifle joint, often in colts, from bruises. Sometimes they cause lameness, at others none. These are best

treated as capped hock. They will be found on the knee joint and in front of the fetlock joint. They seldom cause lameness, but are blemishes, and can often be removed if treated the same as above, but this treatment must be continued for several months, or there will be no use in beginning it. Cysts filled with blood are sometimes found on the point of the hip or on the outside of the thigh. They are soft to the touch. Open them with the knife and squeeze out the contents, and inject about a tablespoonful of zinc chloride one dram, water one pint, twice a day until healed. There is very little trouble in curing such tumors because they are on the fleshy part.

Cysted Tumors in the False Nostrils of Horses.—These will attain the size of a hen's egg. We do not understand what causes them. They are hard to the touch, yet they all contain a fluid sometimes like cocoanut milk, and at others a dark, watery or thick mass. Cut off the hair, cut into the tumor, and squeeze out its contents, then wash it out with water and inject a little tincture of iodine. If it should fill up, open it and clean out, and inject a little more tincture of iodine. It seldom requires to be treated a second time. There is no danger of cutting into this form of tumor, as there are no blood vessels of any importance.

Actinomycosis (Lumpy Jaw).—This is a hard tumor peculiar to cattle, which grows on the lower jaw; sometimes on the upper. It is classed as a malignant parasitic tumor, caused by the presence of a vegetable parasite or fungus. This disease is

thought by some to be caused by an injury. This mass usually grows on the outside of the jaw bone at first, but the healthy nutrition is soon destroyed and the bone becomes diseased, sometimes loosening the teeth, which interferes with mastication, and the animal pines away and dies from starvation. In cutting into the tumor it is gristly, and full of cavities filled with a yellowish red fluid. If the animal rubs the skin off the tumor, which they sometimes do, it becomes an angry looking sore, with a little bloody matter oozing from it. The disease is not contagious. I have experimented for a number of years and have always failed to produce the disease in another animal, even by inoculation, and on that account it is doubtful if it is caused by a parasite.

Treatment: In the early stages of the disease the majority of cases can be cured. Give the animal one dram of iodide of potassium morning and evening in bran mash for three weeks. If the animal's eyes should get watery and considerable saliva run from the mouth, stop for a few days and begin again. Rub the lump once a week with biniodide of mercury one dram, lard one ounce. Continue this for several months, when the tumor will gradually disappear. When the tumor has become sore and matter is oozing from it little can be done. Some few cases can be helped by rubbing on a little bichloride of mercury every third day, using no more at a time than would lie on a ten-cent piece. This will act as a caustic and eat out

the heart of the tumor. It is best applied with a smooth piece of stick.

Melanosis.—Melanotic tumors seem to be natural to gray horses, as they are seldom found on other horses. Their structure consists of connective tissue, intermixed with black pigment cells. They are of a cancerous nature and have been called "black cancer." This form of cancer has been found in nearly all kinds of domestic animals, but most frequently in the gray horse. It is thought that this pigment, which should have colored the hair, is, under certain conditions of the horse, concentrated in one or more places, causing the formation of those black tumors. Their growth is sometimes rapid, at others very slow. Their usual place of forming is on the black skin around the root of the tail, or the udder, although I have seen some cases in the iron gray horses where they have made their appearance over the sides and on the nose. I have removed and seen a great many melanotic tumors, and they have always returned sooner or later. They are of a malignant character and are therefore incurable.

Lymphoma.—This is a term given to a disease which affects the glandular structures, and in cattle usually the glands of the neck. Like the melanotic tumors they are sometimes of very slow development and at others fast. When they affect the glands of the throat and grow rapidly they usually cause suffocation, and the result of such tumors is fatal to the life of the animal. These tumors are considered by some to be of the same nature as

lumpy jaw, but such is not the case. If they are situated so that they can be removed by the knife it may stop their progress for a time, but they are sure to make their appearance again either on the same place or on some gland of the body. These diseases are not contagious.

Epithelial Cancer.—This is usually found at the edges of the mouth, eyelids, vulva and anus. It is more often found in cattle than in horses, and is often the result of injuries. In its early stage if it is properly eradicated it may never return.

Treatment for Epithelial cancer: The most successful form of treatment is the injection of absolute alcohol. This is done with a hypodermic syringe; from a dram to half an ounce of it can be used at a time. If the tumor is small inject a little into its center. If large inject a little into several places at the base of the tumor; repeat every third day until it drops out. Another method is to remove it with a knife or ligature, and when it is removed apply a little terchloride of antimony to the part to destroy the roots. This should be used every second day for a week or two, then use a little of the following to heal it: Iodoform half an ounce, vaseline two ounces; apply a little once a day.

CHAPTER X.

DISEASES OF THE NERVOUS SYSTEM.

The diseases of the nervous system of the horse are more common of late years than formerly, and in some sections of the country. Through the State of Illinois some years there are a number of young horses affected with what is called the "wabbles," where the animal partially loses the use of its hind legs, and if not treated in time will usually prove fatal. The cause of this derangement is not known. It is usually common in the autumn and spring months.

Symptoms: The animal is first noticed, when walking, to suddenly twist its hind parts to one side and wabble a little, then regain the use of the legs, and go on all right for a few steps or a longer distance, then go through the same movements, and in the majority of cases they usually get worse until they wabble all the time, and some of them when down cannot get up without help, and soon die. I have treated a great many such cases. Keep the animal in a loose box or small yard, and give it in the early stage of the disease one dram of iodide of potassium night and morning in bran mash; half the quantity for a colt one year old. Continue this for one week, then give a dram of the fluid extract of nux vomica twice a day, or

one dram of the powdered nux vomica twice a day for two weeks, then skip a week and repeat if necessary; the medicine can be given in bran mash or oatmeal gruel. Also rub the back and hips once a day with soap liniment for a few days, and if the skin becomes tender wait for a few days and begin again. The majority of cases thus treated recover.

Spasms and Convulsions.—Spasms are an involuntary contraction of the muscles, occurring independent of the will, and attended with pain. They remain for a long time or pass off suddenly. I have seen cramps of the muscles of the stifle last for days, the spasm coming on as soon as the animal moved. Robertson says all these phenomena of motor disturbance are probably referable to interference with some portion or other of the nerve centers, this interference extending nearly to irritation, inducing discharges of nerve force, not reaching the extent of destruction of nerve tissue.

Symptoms: The animal is seized with a cramp or spasm in some of its muscles, and for the time is unable to move them. It may pass off in a few minutes, not to return, or it may remain for a long time.

Treatment: In cases where it does not pass off quickly, give the animal a dose of physic; for the horse, aloes one ounce, one ounce of carbonate of soda, and one ounce ground ginger, dissolved in half a pint of boiling water; add half a pint of cold water, and give at one dose. Follow this by giving two ounces bromide of potassium in bran mash three times a day for a few days. Rub the

affected muscles twice daily with a little soap liniment.

Phrenitis (Inflammation of the Brain).—This is at first congestive, subsequently inflammatory. It is known as "Phrensy," and is usually caused by injuries or a too plethoric state of the system. It is often prevalent in very hot weather.

Symptoms: The congestive state is stupor, slow pulse, respirations slow and rough. The membranes of the nose and eyes are very red, and the animal seems "foolish." Soon fever sets in with a full, fast pulse, fast breathing, a wild, staring condition of the eyes. The ox bellows and charges at all available objects. The horse strikes with his fore feet, and in some cases will tear anything within reach with its teeth, and it is dangerous to go near him. As the disease advances there are convulsions, with more or less loss of power, and the animal may fall. "There is a want of method in the fury of a phrenitic ox not discernible in that of a rabid one." Later, paralysis sets in, soon followed by death.

Treatment: As soon as possible secure the animal and bleed if necessary from both jugular veins from six to ten quarts; this will relieve the pressure on the brain. Apply ice or very cold water to the head and give a strong dose of cathartic medicine, one and one-half pounds Epsom salts for the ox and one ounce aloes and one dram of calomel for the horse. Also give tincture of aconite in doses of twenty to thirty drops every two hours in a little water. When it is difficult to give bulky

physic give from ten to fifteen drops of croton oil in a little linseed or castor oil; this can be repeated in twenty-four hours if needed. This disease is distinguished from impaction of the stomach by the greater acuteness of the symptoms, the history of the case, and acute fever.

Megrims.—This may be caused by congestion of the brain or not enough blood to it. The ordinary form of Megrims (blind staggers) is a peculiar deranged state of the nerves of the brain or the brain itself, although some cases of staggers are caused by small, ill-fitting collars, which often obstruct the flow of blood in the veins of the neck,thus causing passive congestion of the brain, which is relieved by removing the collar. Defective action of the heart will sometimes cause dizziness or staggers from want of sufficient blood to the brain. Besides these causes there is a disturbance of the brain not well understood which is the most common cause of the Megrims.

Symptoms: The animal stops, shakes its head, throwing it upward and backward, braces its legs, staggers, and falls. The eyes are staring and the nostrils dilated, and the breathing may be rough; the animal gives a few convulsive struggles, gets on its feet, shakes itself, and goes on as if nothing had happened. I have known horses affected in this way every time they were driven facing the sun. The sunlight, I think, caused irritation in some way affecting the brain.

Treatment: There is no cure for this disease. If the animal falls, slacken the harness and let the

head lie flat. If there is cold water near at hand, that can be dashed over the head and neck; in a minute or two the animal will be all right. I have found the attacks fewer when the animal got a dose of physic occasionally; aloes is the best

Congestion of the Brain.—This is usually caused from injuries, such as the animal striking its head hard against the top of a door as in coming out or going into a car. I have seen several cases of this kind, and they may be severe enough to cause rupture of some of the blood vessels of the brain, when a clot forms causing pressure on the brain, or a portion of the brain only may be congested. Congestion sometimes takes place without any apparent cause.

Symptoms: The animal hangs its head, the eyes are wholly or partially closed, the breathing is slow and oppressed, and in some cases it may be loud and rough. If the animal's head is raised, it will throw it into spasms for a few minutes, but soon gets back to the sleepy state, and if it does not turn into inflammation, the animal will likely die in a comatose state, or there may be a few convulsions before death. Cattle in this condition will stand for hours with their heads pressed hard against something.

Treatment: Give a large dose of physic, one ounce of aloes and two drams of calomel, made into a ball for the horse, and one and one-half pounds Epsom salts for cattle. Place ice bags to the back of the head.

Sunstroke.—Sunstroke is a name given to affec-

tions caused by exhaustion and exposure to the hot sun. The great heat and the exhaustion from fast driving, or hard, slow work continued for a long time in a hot afternoon heats the body of the animal to such an extent as to destroy the nerve tissue, so that it does not perform its function, resulting in congestion of the brain or cord, or the heart itself may be the part most affected, or the blood may become changed. In some cases the whole superficial circulation is stopped.

Symptoms: The animal begins to lag behind and stagger along for a few yards, then falls to the ground in an unconscious state. The breathing is noisy and the pulse is small, slow and irregular, and sweat may break out in patches on the body. The animal may die in a few minutes. In some cases which are not so severe the animal becomes used up, staggers in walking, breathing fast, eyes half closed and watery, nostrils dilated. The pulse is rapid and weak, and if pushed on in this condition will soon fall unconscious.

Treatment: On a very hot day a horse at work should be rested often and given a drink of water, and if it should show any signs of lagging it should be stopped at once and taken to a cool place, and if possible be given a stimulant, half a pint of whisky in a little water, or two ounces of aromatic spirits of ammonia in half a pint of cold water, and not put to work for several hours. In bad cases where the animal falls unconscious, it should get one of the above stimulants. I find the best and surest method is not only to apply water to the

head and spine, but to every part of the body. Either turn on the hose or keep two men steady throwing cold water, and keep it up until the animal either dies or gets better. I have continued applying the cold water to all parts of the body for ten hours, and saved an animal that was to all appearance beyond recovery. This cools the tissue of the body, and if it has not been destroyed beyond repair the animal will likely recover. The stimulant should be given every hour, half a pint of good whisky in a little water or two ounces of aromatic spirits of ammonia in half a pint of cold water. When the animal recovers it should not be put to work for several weeks, and should get one dram of sulphate of iron in the morning, and two drams of nitrate of potassium in the evening, good hay and oats and plenty of cold water, all of which will assist in restoring the deranged tissue of the body.

Cerebro-Spinal Meningitis.—This is an inflammation of the coverings of the brain and spinal cord.

Causes: Injuries of various kinds, exposures to cold and damp when an animal is in an exhausted state from over-driving. Sometimes outbreaks of this disease take place, and it is very difficult to determine the cause. It was thought when it broke out in large stables in cities it was caused from bad air, but I have seen an outbreak in the country while the horses were at pasture and in perfect health until the disease appeared. One

animal only may be affected, or a number at the same time.

The first symptoms noticed is the animal is stiff in its movements, especially the hind legs. Then the muscles in all parts of the body, and if the animal is made to move will stagger and may fall, and not be able to rise without assistance, and may not be able to stand when it is raised up; the appetite is lost, there is high fever, pulse seventy-five to ninety, temperature one hundred and five to one hundred and six. Paralysis of different parts of the body, the power to swallow is wholly or partially lost, the eyesight impaired. If the head of the animal is elevated at this stage it is usually thrown into convulsions or delirium. If the animal is lying down it will go through a series of automatic movements and will dash its head. On the other hand coma may take place, and if the animal is not moved will lie perfectly still. The animal usually dies in two or three days.

Treatment: Put the animal in slings as soon as noticed, and give aloes one ounce, carbonate of soda one ounce, ginger one ounce; dissolve in half a pint of hot water, add half a pint of cold, and give at one dose. Also give an ounce nitrate of potassium in the drinking water twice a day. If the animal is suffering give two drams extract of belladonna every four hours. If the animal is unable to stand and is wild with delirium, treatment is of no use. I have never seen any good results from applying cold water or ice to the head. It is rec-

ommended to give one quarter of a grain of sulphate of atropia injected under the skin to stimulate the heart. Aromatic spirits of ammonia in two-ounce doses has also been used, or one-half pint doses of whisky, but I have never seen any good result from their use. There is a derangement which sometimes affects colts at pasture. The first thing noticed is a stiffness in the hind parts, then the animal loses partial control of them; they will stagger from side to side. The animal seems to eat and has no fever. This may continue for a week or ten days, when the animal either begins to improve or loses complete power of its hind parts, and often in a few days dies. When this is first noticed the animal should be taken to the barn and given a dose of aloes according to the age, a one-year-old four drams, a two-year-old six drams, a four or five-year-old one ounce, made into a ball, or mixed with one ounce carbonate of soda and ginger dissolved in half a pint of boiling water; add half a pint of cold water, and give at a dose. Follow this by giving two ounces sulphate of iron and one ounce nux vomica, divided into twelve doses, one to be given twice a day in bran mash. Rub the back once a day with soap liniment. I have met with a few cases in both horses and colts in which the nerves of the back were deranged sufficiently to make the hind parts wabble. The animal may walk a short distance as if it were all right, and all at once the hind parts will be affected as above. This derangement is not

dangerous to life, and the majority are cured by giving one dram of nux vomica in the morning and a teaspoonful of phosphate of calcium in the evening in bran mash. The muscles of the loins should be rubbed once daily with a little soap liniment.

Local Paralysis.—This is usually caused by direct violence or from pressure on a nerve. The most common part affected in horses with this kind of paralysis is the face, which is very often caused by the animal getting cast and the halter drawn tight around the back of the ears under the throat, pressing on the facial nerves as they turn over the jaw bones. As a result, this injury or pressure kept up for several hours causes paralysis of these nerves, and as a result the lips and sometimes the tongue hang to one side and may interfere with the animal's eating, and gives it an unsightly appearance.

Treatment: Bathe all the bruised parts with acetate of lead half an ounce, water one quart. Give a dose of aloes to the horse and Epsom salts to cattle; follow this by giving one dram iodide of potassium twice a day in a mash for two weeks. This will remove any effusion of blood which may have been effused around the nerve, and also give time for nature to heal the parts and probably restore the wounded nerve to its natural condition; and if the animal is not cured give it one dram nux vomica in the morning and one and one-half drams of sulphate of iron in the evening in bran mash, and continue it for three or four weeks. If

this does not cure it try Fowler's solution of arsenic in two tablespoonful doses twice daily in the feed, and continue it for one month.

Tetanus, or Lockjaw.—This is a disease characterized by involuntary and painful continued contractions of the muscles, usually caused by an injury or operation. The nature of this disease is not well understood, but it must be from some morbid agent finding its way into the animal's system through the wound, but of what nature we are not sure, as post-mortems reveal no distinct lesion. There are two forms of lockjaw. One called idiopathic, which arises from some internal cause, or at least we cannot find an external cause. The other is called traumatic tetanus, caused by wounds or injuries. Punctures to the feet by nails is a very common cause, and operations on the tail. It is impossible to say what kind of a horse is most subject to this disease, or what state of the system most favorable to it, as it may happen to any kind of a horse from very slight injury, while another horse may be very badly smashed up and yet escape.

Symptoms of lockjaw: It may begin in any group of muscles, but usually it is either the muscles of the jaws or the muscles of the neck, loins, or hind legs. If it is the jaws there will be a champing of the teeth, with a flow of saliva from the mouth; the animal will try to eat, but cannot, although it may be able to drink water. If it is the neck, the animal if moved will bend its body, but

keep its neck straight, and if you notice, the membrane of the eye will be drawn partially over it, and the nose poked out straight, and the ears pricked up inward and backward. If it is affecting the muscles of the loins and legs the first thing noticed will be the stiffness of the animal's movements, and the hind legs bent outward. In some cases when first noticed all the muscles of the body

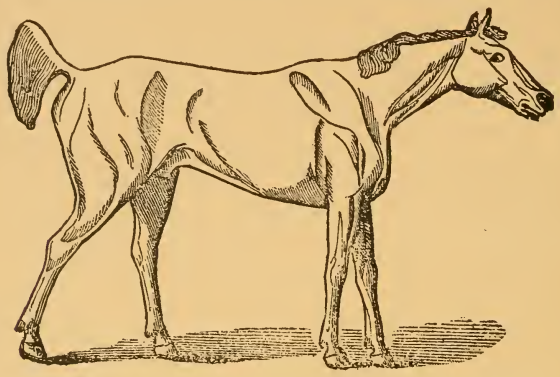

PLATE 3. ADVANCED STAGE OF LOCK-JAW.

will be affected, and if not at first, if not relieved, will soon be.

Treatment: Put the animal in a dark, quiet place, and see that no one goes near him but the attendant. I have found it best in the majority of the cases if the horse had a mate to let it stay with it, as the sick animal would be quieter. The bromide of potassium, if enough can be given, will cure the majority of cases. Give two ounces at a dose four times a day in a little bran mash, thin gruel, or water. Continue this until the spasms relax. I have given as much as three pounds be-

fore I accomplished this. I gave a nine-months' old colt two and one-half pounds, so there is no danger of giving it in large doses. If the animal has lost the power of swallowing it is best to put it out of pain. The injecting of three grains of eserine under the skin is said to be useful in some few cases, but I have never seen any benefit from its use. Since I have discovered the bromide treatment, and the animal can swallow, I have saved all cases. If possible the animal should be placed in a loose sling. By this means it may be prevented from falling during the severe seizure. Applications to the external surface of the body seem to be of little use, but rather augment the animal's suffering. The wound ought to be cleaned out and belladonna extract applied, but I find in most cases that the lifting of the limb to dress it causes more disturbance than the benefit resulting from the treatment. Where the majority fail is in not giving a sufficient quantity of medicine, as it takes at least five times the usual dose to have any effect. I believe if other medicines recommended were given in sufficient doses they might be of use.

Azoturia.—This is a name given to a disease peculiar to the horse, as it has not been seen in any other animal. It is a disease associated with disturbed assimilation and characterized by musculo-nervous spasms of the muscles of the hips and loins and the discharge of high-colored urine. We will not take up the reader's time with the pathology of the disease, as to my mind it has not been

fully made out what it really is; but we do know the cause, prevention and remedy.

Causes: The horse has been at hard work, and for some cause or other it has stopped for a few days, but has been standing in the stable getting its full allowance of food, which seems to have some effect in producing the spasms above mentioned as soon as the animal is put to work.

Symptoms: After the animal is brought out of the stable it will be in high spirits; in some cases it is difficult to hold it after going a short distance; or it may be in some cases that the animal may be driven for several miles before it shows any symptoms, but usually it is only a short distance before the animal seems to hang back and show stiffness in its hind parts; it will then break out in a profuse sweat and seem to be in great pain, and if driven on will likely fall and be unable to rise; the muscles of the loins and hips swell and become as hard as a board, and the animal has no control over them, and is therefore unable to rise; it will show symptoms of pain by the movements of its forelegs and by dashing its head about, and it can usually neither pass feces nor urine. It breathes fast and hard, and the pulse will be fast and full and the temperature high, from one hundred and four to one hundred and five. There is no other disease that can be mistaken for this one, and as the disease is a nervous one I treat it as such, and if the animal is attended to soon will always recover. As soon as a horse shows signs of stiffness on be-

ing driven or worked after standing in the stable for a few days, it should be stopped at once, even if it is in the middle of the street. If this is done the disease will not progress any further. This is a peculiarity of this disease that it requires movement to develop it. Allow the animal to stand for an hour or two, then move it, and if it is still stiff it will then be necessary to give it some medicine, but in the majority of cases it will move off in pretty good shape. In bad cases, when the animal is down, give it two ounces of sweet spirits of nitre and one ounce aromatic spirits of ammonia in a pint of cold water, and repeat it every half hour until four doses have been given. In mild cases, if necessary, give this as an antispasmodic to relieve the spasms of the muscles, and a stimulant to the nerves, put a newly flayed sheep skin on the loins and hips, the flesh side next the skin of the horse; this will produce a great heat, which will give relief. If this cannot be obtained blankets wrung out of boiling water should be put on the loins and kept there by dry ones on top. Change every twenty minutes and continue it for several hours, and to be of any use it requires to be done well. If it is impossible to do this the back may be rubbed with compound soap liniment three times a day and a blanket put on; the bowels should be emptied by injections of warm water and soap, and the urine drawn off with a catheter. If the animal is thirsty give it all the cold water it wants. Half an ounce of nitrate of potassium can be dissolved in it if the animal will take it. It is

recommended to give a strong dose of aloes in this disease, but by the treatment above the animal ought to be on its feet before the aloes could have any effect. If the horse shows any signs of stiffness or drags the leg or legs, give one dram of the fluid extract of nux vomica in a little water, or one dram of the powder in the feed, two or three times a day for a week. If the muscles of any part of the hips or legs should waste rub on a little of the following ointment: Cantharides two drams, vaseline one and one-half ounces. Apply once a week and give gentle exercise. To prevent the disease, if the animal is to be idle for a few days, give it less food, or see that it is exercised every day and there will be no danger of this disease. Mares seem to be more subject to this disease than horses. Ten mares are probably affected with it to one horse.

CHAPTER XI.

INFLUENZA (EPIZOOTIC OR CATARRHAL FEVER).

Influenza is a specific disease of the horse, usually appearing as an epizootic, affecting the mucous membrane of the air passages and sometimes the mucous membrane of the eyelids, giving rise to the term "Pink-eye," or affecting the mucous membrane of the intestines, causing colic or inflammation of the bowels. This disease is attended with marked lassitude and prostration, and usually appears in the spring or fall months, affecting a few animals or all the horses in a district. If a horse affected by it is put into a stable of healthy horses, in a short time a number of them will be taken ill, or it may be all the horses in the stable will be seized with it. The cause of influenza is supposed to be a vegetable fungus, as such has been found in the discharges from the nose. The causes are thought to be the condition of the atmosphere, or the animal being exposed to cold. In the Spring and Fall, when the horse is changing its coat and the pores of the skin are open, the horse is more liable to colds. If the animal is exposed to the cold winds and rains it will likely cause a disease which resembles influenza; but we find when there is an epizootic of it that horses which are well kept will take it as readily as those exposed, and

on that account it seems as if the fungus were the cause. Influenza usually runs its course in two weeks to twenty days, and in the majority of cases if the horse is not worked and carefully nursed it will recover without any medicine.

Symptoms: There is sneezing, a short, troublesome cough, redness and dryness of the membrane of the nose, the eyelids are inflamed, and there will be tears trickling over the face; the pulse is frequent and weak, and the animal does not want to move. In a day or two there will be a discharge from the nose, at first watery, then a yellow matter. The cough, which comes on in paroxysms or fits, increases in depth. The animal keeps its head down and its nose protruded. If the throat is sore it will have difficulty in swallowing water or food. In bad cases part of the food and water will be ejected through the nose. In some cases the eyelids will swell and close the eyes, and on lifting up the eyelid it will be found very red; in this case it is called "Pink Eye." If the fever is high and the pulse from seventy to eighty and the temperature one hundred and six, the horse is in a dangerous condition and requires to be carefully looked after. In the majority of bad cases all the cellular tissue under the skin is affected and there will be more or less swelling of the legs and under the belly; the bowels are usually constipated and the urine scanty and high colored. About the end of the first week a change takes place, the discharge from the nose is increased and thicker, and the cough softer and not so distressing, the pulse is less fre-

quent and stronger, the animal moves about in his stall, drinks with more ease, and the appetite is better, and if no complications take place the horse makes a rapid recovery. On the other hand, if the breathing becomes rough, fast, and labored, there is swelling about the throat, and on putting the ear to the windpipe a rough, harsh sound is heard, laryngitis, or, it may be, bronchitis, has taken place, or lung fever, inflammation of the bowels, rheumatism, or heart failure. Any of these complications taking place will retard recovery or may cause death, and should be carefully guarded against.

Treatment: Give complete rest in all cases. If the appetite is good, give bran mash night and morning with a tablespoonful of ground ginger, two ounces Epsom salts, and half an ounce of nitrate of potassium. Clothe the body and bandage the legs, give all the cold water the animal wants to drink and any kind of food it will eat. If the cough is troublesome put a piece of camphor about the size of a walnut in a pail of boiling water and hold the horse's head over it for fifteen to twenty minutes at a time; this should be done several times a day. Also give a teaspoonful of fluid extract of belladonna and a teaspoonful of chlorate of potassium dissolved in half a pint of water and gargle the throat. If this does not relieve the cough, give one dram of opium and one dram of camphor, made into a ball, three times daily, or give one ounce compound syrup of squills at a dose three times a day. If the animal is weak and does

not eat, give one ounce each of tincture of ginger, gentian and sweet spirits of nitre in a half pint of cold water three times a day. Half ounce doses of nitrate of potassium should be given once or twice daily in the drinking water. Never give tincture of aconite, as it is dangerous medicine to give in this form of disease. After the acute stage has passed give sulphate of iron and gentian, a teaspoonful of the former and a tablespoonful of the latter, in a bran mash or a quart of oatmeal gruel. The animal should now get a little exercise, but no work until fully recovered. If the throat is sore rub on a little mustard once a day for a few days, and steam with the hot water and camphor at least three times a day. If bronchitis or lung fever sets in, the above treatment in the majority of cases will be the best. In addition, apply a cantharidine blister to the sides, made of cantharides, two drams; lard three ounces. Rub in well with the fingers. This is sometimes a great benefit. Physics should not be given, but if the bowels are confined give injections of warm water. If rheumatism sets in, and the joints swell and the animal is very lame, blister with cantharides as above, and give one dram of iodide of potassium twice a day in the drinking water, or give two tablespoonfuls of Fowler's solution of arsenic twice a day in bran mash.

CHAPTER XII.

DISTEMPER (STRANGLES).

This is a disease peculiar to the horse, and it is likely that it will be affected with it some time, but seldom gets out of its colthood days without getting it. It is therefore called "colt ill." It is contagious and can be carried on the clothes of a person from one barn to another. It may break out in a stable and no other cases in the neighborhood. The contagion may have been brought in some unknown way, or I have no doubt but under certain conditions it will develop in a colt or horse that has not been exposed to the disease. A horse seldom takes this disease twice, and it runs a definite course. It is dangerous when checked or interfered with, and is successfully treated when correctly guided to its natural termination. Some seasons the outbreak is of a very mild character, in others it may take on a malignant form and a number of animals may die. There is no accounting for this. Although a good many theories have been brought forward, none is satisfactory.

Symptoms: There are signs of catarrh, the animal is dull, has a cough, and when it swallows makes a peculiar sound in its throat. There is soreness in the throat and some of the water it may be drinking will come back through its nose;

the head is poked out, a little frothy saliva exudes from its mouth, sooner or later there will appear a swelling between the jaws, or sometimes at the back of the jaw; when this takes place the animal has great difficulty in swallowing water and food, especially the former. In some cases there is very little fever and the appetite remains good. In others there may be considerable fever, pulse sixty to seventy. In the course of a few days the inflammation relieves itself in the formation of matter, which will soon come to the surface and break of its own accord if not opened. After this takes place the animal is much relieved. Cases may be met with where a small abscess may form and the animal may show no other symptoms; this soon breaks, discharges and heals. In others, although not very sick, the condition of ill health may continue for several weeks, and finally an abscess appears, matures, and the animal soon recovers. Again, others may swell in the inside and suffer great distress and may suffocate. Irregular strangles is where abscesses form in other parts of the body, such as on the shoulders, hips, flank, side of the neck, or back of the elbow; also in the liver, between the lungs, or in other parts. As long as the abscess forms on the outside it is not dangerous to life, but those on the internal organs usually cause death. The sequel of distemper most frequently occurring is a thickening of the lining of the throat, which interferes with the animal's breathing, causing what is called roaring or whistling. The more serious sequel is blood poisoning

from the absorption of matter from the abscesses forming on the internal organs. About the ninth or tenth day the animal ought to begin to improve. On the other hand, if at that time the fever is increased, appetite lost, breathing is fast and somewhat labored, and the temperature one hundred and five to one hundred and six, there is occasion for alarm, as it indicates that something is going wrong inwardly.

Treatment: In the early stages of distemper put the animal in a warm, well-ventilated stable. Clothe the body and bandage the legs. If the throat is sore put a piece of camphor gum into a pail of boiling water and put it under the animal's head and throw a blanket loosely over it to keep in the steam; continue this for fifteen to twenty minutes and repeat it three times a day. Dissolve two drams of chlorate of potassium in half a pint of cold water and put in one teaspoonful of the fluid extract of belladonna. Shake up and gargle the throat. This is best done by holding the head a little above the level and pouring a little into the mouth; rub the tongue to make the animal move it. If the animal coughs, let the head down at once, and after it ceases coughing pour in a little more, and so on until it is all used; do this three times a day. If there is any fever give half an ounce of nitrate of potassium in its drinking water once daily. Physic should not be given. If the bowels are confined give injections of soap and warm water. If an abscess forms, poultice it with warm linseed poultice, changing it once a day. When

the abscess becomes soft, open it and inject a little lotion made of carbolic acid, half an ounce; water, one pint. Poultice for a few days after it breaks, to soften the surrounding parts so that there will be no bunch left after it heals. After the acute stage has passed mix and divide into twenty-four doses, four ounces sulphate of iron, four ounces nitrate of potassium, and two ounces nux vomica, one to be given twice a day in bran mash mixed with a little oats. If there should be a great discharge of matter from the nose after the animal is convalescent, put one ounce oil of turpentine into a pail of boiling water and put it under the head as above; do this several times daily. If the abscess is tardy in forming, rub on cantharides, two drams; vaseline, one and a half ounces. If the glands of the neck should remain enlarged after the animal has recovered, rub on biniodide of mercury, one dram; lard, one and a half ounces. Repeat every second week. If abscesses form on other parts of the body they should be treated as above. If the animal's appetite is poor, give one ounce each of tincture of ginger, gentian, and chloride of iron in a quart of oatmeal gruel three times a day. Give the animal small quantities of food at a time and often, as it will eat a little fresh hay or oats when it would refuse to eat that which was in its manger.

CHAPTER XIII.

GLANDERS AND FARCY.

Glanders is a malignant contagious disease peculiar to the horse, but can be produced in any of the warm-blooded animals by inoculation. It is characterized by a discharge, usually from one nostril but sometimes from both. It is watery, viscid, or purulent, and of a bluish color; the mucous membrane of the nose and the sinuses of the head, the throat, windpipe, and also the lungs are specifically affected. There is usually an enlargement of the lymphatic glands under the jaw. Glanders is a very old disease. The earliest notice of this disease is that by Aspyrtus, a veterinary officer in the army of Constantine the Great in the fourth century, and also by Vigitius. It was described by these early writers on diseases of the horse as Malleus, Morbis, Humidus, etc. Glanders is a disease of the temperate regions; it does not exist in Australia and some other warm countries, nor in very cold ones, although there are exceptions. It exists in Norway and in Java. The cause of glanders in the great majority of cases is either by contagion or inoculation, and most cases can be traced. On the other hand, when a number of horses have been crowded together, as in times of war, and where all the horses underwent such rigid inspec-

tion as to leave little doubt that glanders did not exist, yet it was not long before glanders made its appearance. I believe that a disease which is peculiar to any class of animals can be produced spontaneously if surrounding circumstances are favorable for its development. The conditions which would likely be most favorable to cause glanders are badly ventilated stables, such as are common in large cities, hard work and poor food. It is stated that it has broken out in stables which have been newly built and plastered and the horse put in before the place was perfectly dried. Diseases which exhaust and depress the system and deprive the blood of its proper nutrition, chronic nasal gleet, which runs down the system of the horse, may cause it. Farcy is the same disease as glanders, only in a milder form, and usually affects the lymphatic glands on the inside of the legs, which swell and burst and discharge a matter. A horse affected with farcy may give another glanders.

Symptoms: The chronic form of glanders is that usually seen in this country. There is a discharge from the nose of a bluish, watery, sticky matter, usually from one nostril. In looking at the membrane of the nose, sores will be seen from the size of a pinhead to that of a dime; these sores or ulcers are gray in the center and purple at the edges. In the early stages of this disease there may be no ulcers in view. It will be necessary to hold up the horse's head and have the clear light shown as far up the nostril as possible, or a re-

flector may be useful. Some press their fingers up the nostril and feel for the ulcers. A chronic discharge from one or both nostrils may not be a case of glanders, as that can be produced either from nasal gleet or a diseased tooth, and many valuable animals have been destroyed, when upon examination after death a decayed tooth has been found to be the cause. What we have to look for in a case of glanders is the glazy, sticky discharge from one nostril, usually ulcers in the membrane of the nose, and hard swellings of the lymphatic gland under the jaw, and usually adhering to the side of the lower jaw, and the absence of any other cause for the discharge. In nasal gleet the animal should be destroyed in case it should turn into glanders. The animal is usually unthrifty, the coat is rough and dirty, and although the animal may eat well, it does not keep in good flesh. I have seen some few cases in which the animal was to all appearance healthy, with a fine, sleek skin.

Acute Glanders.—This is usually caused either by inoculation with glandular matter from a chronic case by some of the matter becoming absorbed into the blood, or a glandered horse may receive a wound and some of its own matter may get into it and cause acute glanders. The first symptoms of acute glanders are shivering fits, indicating great fever; these fits are often persistent, the pulse is increased seventy to eighty beats per minute, the breathing is fast, and the temperature rises rapidly from one hundred and six to one hundred and seven; the animal is in great distress,

the membrane of the nose swells and the animal snuffles or in some cases nearly suffocates; there is rapid emaciation and pimples appear on the membrane of the nose, either in groups or scattered; they can be distinguished by their grayish or yellowish-gray center and a red ring on the outer edge. In a few days the centers drop out, leaving a little pit with the true characteristics of an ulcer. These ulcers are not disposed to heal, but rather to spread, and become deep and extend through the septum nasi (the division between the nostrils). The discharge from the nose, which at first was slight, is now profuse and may be tinged with blood from rupture of some of the small blood-vessels, caused by the ulcers. I have seen some cases in which the division was completely ulcerated and destroyed so that there was none of it left. The lymphatics in all parts of the body become affected, the head, legs and belly swell, and there may be an oozing of matter of a yellow color from the swollen parts. The lungs become involved and the animal soon dies. An animal affected with acute glanders seldom lives more than from twenty to thirty days. Farcy is the name given to glanders when it first makes its appearance in the legs, and may be produced by inoculation with the discharge either from glanders or farcy sores, or by coming into contact with horses affected with glanders. It may also be produced by an animal getting into that condition of health favorable to originate farcy. Why the same infecting virus should especially select the

mucous membrane of the nose and air passages in one case and select the skin and its connective tissue and the superficial lymphatic glands of the legs in another is not easy to determine. I will divide farcy into two forms, the acute and chronic.

Acute Farcy.—The symptoms are fever, high temperature, and fast pulse, seventy to eighty per minute; loss of appetite, and the skin takes on an unhealthy appearance and there may be shivering spells; the legs swell and the lymphatic glands up the inside of the legs are tender to the touch; there will also be more or less swelling under the belly. After a time the general swelling gradually subsides, circumscribed lumps appear, known as farcy-buds, and a corded condition of the inside of the hind legs. These buds arise from the skin very suddenly and after a few days the skin bursts and there is a slight discharge, leaving a raw, deep sore or ulcer. These ulcers distend and discharge a foul, creamy liquid tinged with blood. These have the characteristics of the ulcers of glanders found on the membrane of the nose. Their tendency is to spread, and they do not heal easily, if at all. The lymphatics of the legs remain swollen and somewhat painful if the animal is moved or they are pressed upon. Although the horse may regain its appetite, the fever never leaves, and the animal soon becomes very much emaciated, and prostration goes on rapidly. It terminates either in acute glanders or the animal dies from sheer exhaustion.

Chronic Farcy.—This form is manifested by lo-

cal swellings, tumors or buds in connection with the skin and the surrounding tissue. After a time these soften and ulcerate, leaving an unhealthy, ragged, open sore, which discharges a liquid and has no disposition to heal. These tumors are found in various parts of the body—on the face, under the jaws, sides of neck, anterior parts of chest, inside of the fore legs, along the belly, over the flanks and inside of the hind legs. These tumors vary much in size in different parts of the body. The lymphatics in the neighborhood of these tumors are swollen and hard, and inside of the hind leg they will be corded. The appetite of the animal may remain good and do its work as usual, and may remain in good condition, but usually they become dry-haired and take on an unhealthy appearance. Although some cases of chronic farcy recover, it is not well to undertake treatment, for your own safety as well as for the safety of the other horses which might become affected with the disease. The treatment would be to give the animal two drams of sulphate of copper twice a day in mash, and continue it for a month; feed good hay and oats; wash the sores and dress them by dusting iodoform powder on them twice daily, or by washing them with chloride of zinc, one dram; water, one pint; or sanitas oil, one part; sweet oil, two parts, and keep the animal separated from the others while undergoing this treatment. Stables and old houses in which a glandered or farcied horse has been, as well as harness, clothing, etc., must be disinfected. Everything in

the stable which can be removed should be burned; the clothing and harness can be boiled, which will destroy the germ. All parts of the building should be washed with carbolic acid, six ounces; water, one gallon. After it has been thoroughly washed, close all the doors, windows and all openings tight. Then put from one to two pounds of sulphur in a pot containing burning coal, and keep it close for ten or twelve hours. Then throw open the doors and windows for several days before putting horses into it. The drains of the stable and the dung, and in fact everything in which there is any possibility for any of the diseased germs to find lodging, should be destroyed. If there is a drain, large quantities of fresh water ought to be forced through, and finish by mixing carbolic acid and water and flush that through and burn the dung.

CHAPTER XIV.

HORSE POX (VARIOLA EQUINA).

This is a pustular disease, making its appearance most commonly on the fetlocks and pasterns, but may be found on other parts of the skin or the mucous membrane of the nose, and cases have been reported where the mucous membrane of the lungs became affected. On account of it breaking out on the pasterns it has been mistaken for grease in the heels. This disease usually makes its appearance as an epizootic. It appeared in this form in Canada in the winter of 1876; hundreds of horses were laid up at the same time. It started in Montreal, and spread rapidly by contagion. The first symptoms noticed in the majority of cases were: The horse was dull and slightly stiff, the appetite usually remained good; next, slight swellings of the fetlocks, and if rubbed with the hand they would be hot and tender to the touch, and soon hard, rather flat lumps, from the size of a pea to that of a half-dollar, could be felt. These soon sunk in the center and a small piece of skin would drop off, leaving a pit from which was discharged a copious, thin gray fluid, which would irritate the parts it passed over, causing them to become sore. If it lodged around the coronet for some time, it would cause a separation of the hoof, and in some

cases the fluid would get in between the hoof and sensitive parts and cause great pain and destruction of the part. Where a considerable part of the pastern and fetlock was affected, the discharge would be sufficient to cause the bedding to become wet with it, or if bandages were put on they soon became soaked with the fluid. In a number of cases the hind legs would swell to a great size, and sometimes the pustules would appear on the inside of the legs, causing great lameness. In some cases there would be considerable fever, pulse sixty to seventy, temperature one hundred and two to one hundred and five, appetite poor, urine scanty and high colored, and the bowels confined. In some cases where the swelling was great the animal could not rise if it lay down; but in most cases they do not lie down. Those attending animals affected with this disease, if they are not careful to wash their hands well with soap and hot water and then use carbolic lotion (half an ounce to a pint of water) and a nail brush to clean under the nails, are very likely to suffer greatly, as it will affect the tender part under the nails. I know of a number of cases of this kind also from picking the nose or putting up the hand before it was properly washed to protect the ear from the cold. A great many laughable but painful cases occurred to men attending horses having this disease, but I only know of one fatal case in man from it.

Treatment: When first noticed, and before the pustules break, grease all around the top of the hoof and heels with lard and vaseline, so that it

will prevent it from injuring the coronet and heels. Give the horse half-ounce doses of nitrate of potassium three times a day in bran mash or drinking water. If the leg is swollen above the pustules, bathe it with acetate of lead, half an ounce; water, one quart. It is best not to use any medicine or water on the pustular parts, as it will only delay the progress of the disease. When the pustules burst I have found great improvement by spraying on the sores carbolic lotion (two drams to one pint of water). Washing the parts, as is often done, keeps the healing process back. Do not remove any scabs that form. If the pustules should break before there was any lard rubbed around the coronets and heels, and they have not become sore, wash off clean with soap and water and apply a little carbolic lotion, and when the part dries rub on the lard; be very careful about this, as it will save the animal a great deal of pain and the owner much trouble. If the sores are slow in healing with the carbolic lotion and they have ceased discharging, use a little oxide of zinc ointment; strength, one ounce zinc oxide, vaseline two ounces. If the mouth becomes the seat of the disease and the lips swell, it will be necessary to feed the animal on soft food and bathe the lips with a little lead lotion. If the throat or bronchial tubes of the lungs, treat as recommended for lung troubles. Keep the animal in a comfortable, dry place and give it all the food and cold water it will take.

CHAPTER XV.

BLACK LEG (INFLAMMATORY FEVER).

In the Veterinarian, February, 1880, Dr. Greenfield's lecture on this disease says: "This disease did not appear in healthy animals inoculated with black leg virus, and no bacteria was found in the blood of animals affected with this disease, which shows that it is not an anthrax disorder, but is brought on by the kind of food the animal is fed upon. Cattle of all ages are liable to become affected, but young stock appear to be most readily so; six-month-old calves and up to two years, seem to be those usually affected when changed from a poor pasture to a rich, especially low-lying lands. Such animals fatten with rapidity and soon attain a high state of plethora, when perhaps some of them become lame. Stop feeding and soon a swelling appears in some part of the body, especially about the hocks or stifle. It is hot and very painful, and is often mistaken for an injury. If at first it was painful, the pain soon leaves, and it becomes insensible, and if cut with a knife, a little watery black blood will exude. The part has become gangrenous, cold, and crackles on pressure as if it was full of air. This is caused by the formation of gas from the decomposition of the blood. Later on, when the swellings are cut into there will

be an accumulation of putrid sanious and yellow gelatinous material under the skin and between the muscles, also black patches on various parts of the body. At the beginning, or if the animals are noticed, there will be fever, loss of appetite, high temperature. It is said that when the swelling begins, the fever subsides a little, but I have not seen this in the cases that came under my observation. The animal becomes rapidly feeble and soon dies. In the early stage the bowels are usually confined, and near the end blood is mixed with the feces. The animal stands with its neck outstretched, breathing rapidly, and with a moan. Some few cases recover when the animal has strength to throw off those parts which have become mortified, leaving ugly sores, which after a time heal by granulations. On post-mortem examinations, besides what is seen on the outside, there is congestion of the lungs, and the bronchial tubes are filled with a tough, frothy mucous. This disease is seen in certain places and at certain times,—the spring, early summer, and autumn. It never occurs in winter in cold countries. Poor animals are never affected with this disease, and can be prevented by not overfeeding, especially on rapidly-grown grasses on low lands. If the animal has to be fed on such grass, allow it to be there for a short time each day and then remove it to a poor, short pasture and feed some dry food, such as hay. After the grass has grown and becomes harder there will be no danger of allowing the animal to remain in it all day.

Treatment: Open the swellings with a knife and inject carbolic acid half an ounce, water one quart, or inject a lotion of this kind all around the swelling with a hypodermic syringe. Give one ounce each of tincture chloride of iron, ginger, and gentian at a dose three times a day in half a pint of water; this dose is for yearlings. Half this quantity for a calf six months old. Remove all the well ones and give a dose of Epsom salts, four ounces for a calf, half a pound for a yearling, one pound for a two-year-old, and one and one-half for a cow. Feed on dry food or turn into a poor pasture, and if this is done there will be no further trouble.

Pyemia (Blood Poisoning).—Septicemia pus getting into the blood is best treated by tincture chloride of iron, gentian, and ginger, one ounce each three times a day, and feeding good food.

CHAPTER XVI.

RHEUMATISM.

This is a disease characterized by more or less pain and swelling of the joints, although in some cases no swelling appears. There is a tendency to shift from one part to another; that is, a horse may be lame in one leg for a day or two, then the lameness shifts to the other, and so on; or the soreness may remain for months in one place. I have seen cases where one hind leg and one fore leg were affected at the same time. There is a great difference of opinion as to the nature of this disease. It is described to be a specific acute fever caused by some morbid material in the system, having a special tendency to affect the coverings of muscles and tendons, causing great pain and lameness, and I have no doubt but such is the case sometimes. It is thought to be caused by an accumulation of urea in the muscular structure, and by increasing the elimination of this material from the system the rheumatism disappears. When it affects the joints there is an effusion of a fluid material which invades the capsules of the joints, causing them to swell.

Symptoms: Of the local symptoms there will be lameness, severe and sudden; when the animal was last seen it was all right, but now it is hardly able

to move, and if it does, it is with great difficulty. On examination one or more of the joints will be very painful. There may be no swelling, but usually there is. The joints most frequently affected are the stifle and fetlock. The hock and hip less so. The swellings, when occurring, are usually between the tendons, and if in the hock joint may be taken for bog spavin. The pain continues, it may be, only for several hours, or it may be for several days, when all at once in some unaccountable manner the pain and swelling become reduced or may entirely disappear, to shift to some other joint or limb, and so on until it may disappear altogether. These local symptoms are generally accompanied with more or less fever and a decided rise in the temperature. The pulse is from sixty to seventy per minute and the breathing somewhat increased.

Treatment: For this form of rheumatism I find that a good dose of physic is useful, and the best is one pint of raw linseed oil and twenty drops of croton oil. This is for both horses and cattle. Follow this by giving nitrate of potassium half-ounce doses three times a day in the drinking water. If the pulse is fast and full, give tincture of aconite in twenty-drop doses every two hours in a little water. After several days, if there is no improvement, give dram doses of iodide of potassium three times a day with half an ounce of wine of colchicum. When all fever has subsided, Fowler's solution of arsenic in half-ounce doses twice a day in bran mash is often very useful.

Treatment of Rheumatism in Horses and Cattle. —Salicylic acid does not seem to be of much use. If this derangement becomes chronic and the joints remain swollen, blister them with cantharides two drams, lard one ounce; rub in well and let it remain on for twenty-four hours, then wash off and grease. Repeat in two weeks and give half-ounce doses of Fowler's solution of arsenic twice a day in a bran mash. I find this is the only remedy for chronic rheumatism.

There is a derangement which I think proper to call rheumatic inflammation of the muscles, especially the muscles of the loins and the hind legs, although the muscles of other parts may be affected. I have had a number of cases of this kind and they have all been from the same cause: exposure to cold in cold, damp weather when the animal has been heated. One case was from driving a horse a long distance and then turning it out to pasture late at night, and during the night it rained and became cold and the horse was found on the following morning standing with its feet gathered up underneath it, with back arched, and it was with difficulty the animal could be moved. There was considerable fever and the muscles were sore to the touch. It kept constantly lifting first one hind foot, then the other, and had the appearance of a horse that was foundered; the feet were cool and the muscles sore, and if the horse lay down it suffered great pain and would not lie still one moment. If it were founder the feet would be hot and the animal would be comfortable while

it was down. The above are the symptoms of this trouble. In bad cases the animal will not eat, but drinks freely.

Treatment: Give a dose of physic to clean out the bowels and reduce the fever, also give tincture of aconite in twenty-drop doses in a little water every two hours for the first day. After the physic operates, if the animal is in much pain, give two ounces of opium three or four times a day in a little water. Bathe the legs and loins with hot water, taking care that the animal does not get cold after it. After bathing for half an hour, dry and rub the parts well with soap liniment, then blanket and cover up the legs. Keep the kidneys active by giving half-ounce doses of nitrate of potassium. After two weeks, if the animal remains stiff give half-ounce doses of Fowler's solution of arsenic in bran mash and continue it for several weeks. If the joints should swell and remain sore, blister with cantharides as for rheumatism.

CHAPTER XVII.

TUBERCULOSIS.

This is a constitutional disease, usually locating itself in the lungs, although it is found in other organs of the body, such as the glands of the intestines, mesenteric glands, and glands of the udder. This disease affects cattle more than any other domestic animals. This disease is hereditary and is found more frequently among cattle that have been inbred. It is also most common among the improved herds, thus short horns, especially good milkers, are more predisposed to this disorder. In the last few years a great deal of attention has been called to this disease, and a few veterinarians have allowed themselves to be carried away beyond the bounds of reason on this disease and have caused needless alarm and have done a great deal of harm to the cattle industry, as well as scaring the people.

Tuberculosis is a very old disease and is described by writers several thousand years ago, and if the disease is as contagious as some are asking the people to believe, there would not be a warm-blooded animal alive. Their theory is that rats, mice, and other small animals which eat out of feed boxes of cattle affected with tuberculosis will contract the disease and give it to others; also, that a

person who has tuberculosis attending to cattle will give the disease to them, and that it is contagious and infectious from one animal to another; also, that the milk and flesh of an animal affected with the disease is unfit for food. If this were the case, and as many cows affected with this disease as they represent, I think very few people would be free from the disease. Such, however, is not the case, as the census of Europe shows that tuberculosis is on the decrease, and this is accounted for in the improved condition of living, more meat and milk being used than in days gone by. The slaughtering of cattle to stamp out tuberculosis is out of the question if the disease can be spread from the human being to the cattle they attend, and also from the rats and mice. I think the people are awakening to the absurdity of what has been done and are taking a common-sense view of the matter. I would suggest the use of tuberculine be discontinued, as there is danger of it producing tuberculosis in healthy animals, and as long as cows and other cattle are in good condition, eating well, giving a good supply of milk, etc., they should not be interfered with. If a cow should show signs of ill health it would be wise to have her examined by a qualified veterinary surgeon, and if tuberculosis was discovered the animal ought to be destroyed, or at least separated from the others and put under treatment for several months.

Symptoms of tuberculosis: The first is a cough, but the cough of itself is not sufficient, as a cough is often caused by irritation of the throat. Suc-

ceeding the cough there will be dry skin and the hair standing up, and the animal gradually losing flesh, although the appetite may remain unimpaired. The mucous membranes are pale in color and the pulse becomes weak, and if the animal is driven fast, there will be a tendency to suffocation or difficult breathing. If the cow is giving milk it decreases in quantity and quality, and by degrees the animal becomes greatly debilitated; pain is evinced on pressure on the ribs, the temperature of the body is usually increased to a hundred and two to a hundred and three. This condition may continue for several months. When the cough becomes hacking the respiration becomes very fast and the pulse quick and weak; diarrhoea sets in and carries off the animal.

Treatment: If treatment is tried, use tonics and stimulants. Tincture chloride of iron, ginger and gentian, one ounce each, given in gruel or water three times a day. Boiled flaxseed given in bran mash once a day is very useful. But it is wise to destroy at once when the case is one of tuberculosis.

CHAPTER XVIII.

FRACTURES AND DISEASES OF BONES.

Fractures usually occur from violence, such as a kick, slipping and falling, and sometimes from violent contracting of the muscles. The bones of old animals are much easier broken than those of the young. Bones are more readily fractured by a diseased condition, and at times the bones are more brittle than at others, and a trivial cause may produce fracture, as I have known fractures to occur while a horse was traveling on a level, hard road. The bones of most healthy animals will bend slightly, and for this reason will often prevent fracture. There is a little elasticity to all bones, especially to the young. Simple fracture is where the bone is broken without wounding the soft parts. Compound or open when there is an open wound communicating with the broken bone. Comminuted when the bone is broken into several fragments. Complicated when together with the fracture there is serious injuries of the adjoining structures, lacerated, open joint, or serious contusion of the tissues. In the majority of cases the only kind of fracture that is worth treating is the simple, for the reason that it is impossible to keep the animal quiet, and that the ends of a fractured bone with wounded flesh will keep up the irrita-

tion, causing inflammation and mortification. The bones of the horse or cattle will unite as readily as in the human being if we could only keep the parts quiet.

Mode of union: First, there is an exudation of lymph, which is at first slightly granular, but becomes, at a later period, elastic and moderately firm. It soon attains firmness, which is called a callus, and by degrees this is consolidated into hard bone. After a time the callus becomes partially or wholly absorbed, leaving the parts nearly smooth. Therefore in simple fracture, even if the parts are not kept quiet, the developing process will go on. It being elastic, will at first allow of a certain amount of motion, and as it hardens the motion becomes less until it stops altogether. I have known colts to be turned out with a broken leg, and if inflammation did not set in, would soon get all right.

Treatment of fractures: The first thing to do is to reduce the fracture as soon as possible and keep the ends of the bones in apposition to prevent them from lacerating the flesh or soft tissue; and before swelling and inflammation set in, place the horse in a sling. This can be done by fixing four posts wide enough for the animal's body and far enough apart so that the posts in front will be in line with the horse's breast and the others at the hips. Then take two poles and sew strong bags to them and place one of the poles on each side and the bags under the animal's belly, then fasten the poles to the posts and put a cross-piece in front and one

behind, and your sling is complete. The cross-pieces should be well padded to prevent chafing. When the animal is put into the sling, then the fractured parts require to be kept in their places. This is done by splints and bandages. Take long strips of muslin about four inches in width and put them in starch and wrap them several times around the part, then apply the splints, which can be made of pieces of wood, hard leather, or gutta percha. Then roll a starched bandage around the splints to keep them in their places. Some use the plaster of paris bandages, which are useful. If an animal gets its leg fractured in the pastern and cannot be taken to the stable, I have had good success by applying the starched bandages and using splints, without putting the animal in slings. Block tin made to fit the part is very useful for this purpose, as it is light and easily kept in its place. Animals may be very lame for a long time after the fracture has united, but if no joint is involved recovery will gradually take place.

Symptoms of fracture: When the leg is the part fractured there is sudden and great lameness, with more or less deformity, and the animal is unable to bear weight upon that leg. By applying the ear to the part and moving the limb a crepitating sound will be heard. If it is a simple fracture, without the soft parts being injured, it is advisable to try treatment. On the other hand, if the soft parts are wounded and the animal not of much value, the wisest plan is to put it out of pain. If the animal is a valuable mare or stallion treat-

ment might be tried, for although the limb was deformed or the animal lame, it would be useful for stud purposes.

Fractures of the Anterior Iliac Spine.—This form of fracture is usually caused by the animal falling on its haunch or striking it against the side of a door post, gate or wall, breaking off a piece of the most prominent part of the quarter. It does not always cause lameness, but is easily seen by the flattened appearance of the quarter. If the bone is completely broken off it will be drawn down by the abdominal muscles. I saw a case of this kind. A young horse while running slipped and fell, fracturing its haunch. The parts inflamed and separation took place, and the piece of bone was drawn down to the flank, where it caused inflammation. Matter formed. I opened it and removed a piece of bone half the size of the hand. The wound was treated and the part healed. Little can be done for a case of the kind except to keep down local inflammation by giving rest and applying cold applications, and if matter should form it indicates that there is a piece of the bone detached, which will have to be removed, and then dressed as for an ordinary wound.

Fracture of the Shaft of the Ilium.—If the ends of the bone are not displaced the animal may not go lame, but if they are the lameness will be great. In a fracture of this kind the horse will drag its leg and will not be able to support its weight on it. The other parts of the limb being all right our attention is directed to the bones of the hip and at

the place of fracture there will be, in the majority of cases, a sinking of the muscle end; on applying the ear to the part and moving the limb gently a crepitating sound will be heard, the ends of the fractured bones grating. If the fracture should be in the hip joint treatment would be of no use, but if the animal is a valuable mare, put it in a sling and keep as quiet as possible, and if the muscles swell apply cold water. I have seen a few cases of fracture of the shaft of the hip bone unite and the animal be as useful as before the fracture.

Split or Fracture of the Pelvis (Symphysis Pubis).—This happens frequently in fat cattle if kept on slippery floors, the feet spreading and the animal falling, causing a split in the union of the two bones, called the pubic bones. In this case nothing can be done in the way of treatment.

Fracture of the Tuberosity of the Ischium.—This is caused from the patient falling back on its buttock. The symptoms of this are an alteration in the shape of the buttock. On moving the part a crepitating sound will be heard; there will be some lameness and swelling. If the bone is not detached it will soon reunite if the animal is given rest. Very little treatment is needed in this case. If the part swells much, bathe it several times daily with cold water. If it becomes detached matter will form, and on opening the part the detached bone can be removed and the wound treated as usual.

Fracture of the Femur (Thigh Bone).—This fracture is caused by the animal falling with its leg

under it, and sometimes by contraction of the muscles of the thigh. Symptoms of this fracture are shortening of the leg, the toe being turned inward, and a depression in the muscles over the seat of the fracture. In such a case put the animal in slings. If it is a simple fracture it will likely unite, but if it is a compound fracture it is better to destroy the animal.

Fracture of the Stifle Joint of the Patella (Stifle Bone).—This is caused by violence, such as kicks. This kind of fracture is incurable. Fractures of the lower part of the leg are the same as in the front leg.

Fractures of the Ribs Caused by Kicks and Other Injuries.—If the ends of the ribs are pressing on the lungs it will be necessary to cut down on them and draw them outward and apply a pitch plaster over the opening to prevent air getting into the lungs. In the treatment of all fractures it is necessary to keep the animal as quiet as possible, and in some cases it requires someone to be in constant attendance. The animal should have a physic to cool the system, a dose of aloes for the horse and Epsom salts for cattle. This to be followed by giving half an ounce of nitrate of potassium in the drinking water once a day. If the animal is suffering much pain give two drams of opium made into a ball, or give it in a little oatmeal gruel; or if there is much fever a few doses of tincture of aconite, twenty drops every two hours in a little water. If the injured parts are hot and tender bathe them several times a day with acetate of lead half an

ounce, tincture of arnica two ounces, water one quart. If matter forms open the part and clean out well with carbolic acid one dram, water half a pint. Usually if matter forms at the fractured part it will be best to destroy the animal.

Dislocation of the Patella (Stifle Bone).—This occurs most frequently among young horses and colts. In some colts the muscles attached to this bone become relaxed and allow the patella to slip out and in at every step with a clicking sound.

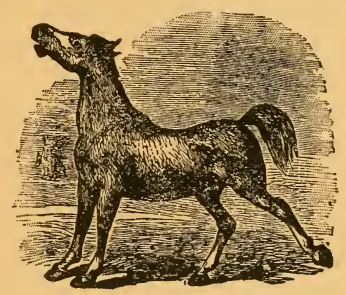

PLATE 4. DISLOCATION OF THE PATELLA (STIFLE).

Very commonly both patellas will be in the same condition.

Causes of dislocation of the patella are slipping on rising in the stall, or the animal starting suddenly and the hind leg slipping too far forward, thus slackening the muscles of the stifle too much and allowing the bone to slip off. It may also be caused by cramps of the muscles of the outside of the stifle.

Symptoms of dislocation of the stifle: The horse stands with its affected leg stretched out back-

ward. There is total inability on the part of the animal to bring the leg forward, owing to the patella being on the pulley-like groove. Sometimes the animal will be found standing solid on its foot, but on trying to move the animal it seems fixed to the ground, and if forced to move it will hop on its legs, with the affected one stretched out behind. On looking at the joint a swelling will be observed on the outside. This is the stifle bone. It cannot slip to the inside on account of the high projection of the inside of the pulley. If it does take place it will be found that the ligaments which hold it in place have been ruptured, and the animal will be of no use.

Treatment: In cases where it moves out and in at every step, or if it happens to the animal frequently, keep the animal quiet in the stable and apply a blister of cantharides two drams, lard one and one-half ounces. Repeat every second week until the part is well. It is sometimes useful to give a case of this kind a teaspoonful of phosphate of calcium twice a day in a bran mash for a few weeks. This will give strength and tone to the muscle fiber. In cases of dislocation of the patella by accident put a rope around the fetlock joint of the affected leg, and the other end through a strap or collar on the neck, then let two men pull on the rope and in this way bring the affected leg as far forward as possible. The operator stands behind the horse with one hand on the inside of the joint, and with the other pushes the patella on its place, which it will do with a snap; then remove the rope

and the animal will walk off as if nothing had happened. If it has been out for some time there may be some swelling and soreness of the part; bathe it with acetate of lead half an ounce, tincture of arnica two ounces, water one pint. I have seen some cases in which the stifled animal jumped over the fence where it was confined. In doing so the patella was forced into its place, and the animal galloped off as if nothing had happened. This method has been tried without success, and as there is danger of the animal making matters worse I do not recommend it.

Dislocation of the Pastern Joints, or a Tendency to "Knuckle Over."—This is usually caused from diseases of the feet or overwork. It is sometimes seen in colts from weakness in the joints.

Treatment: Give the animal rest, and blister the joints with cantharides two drams, lard one ounce. For old horses and for colts put one and one-half ounces lard. Repeat this every second week for several months. If the animal is old and the joint diseased treatment will be of no avail. If it is caused from overwork, either in young or old, besides the blister give a teaspoonful of phosphate of calcium in the morning and a teaspoonful of sulphate of iron in the evening; continue this for a month if necessary.

Complete dislocations of the other joints cannot take place without rupture of the binding ligaments of the joint, and in that case it is always wise to destroy the animal.

CHAPTER XIX.

DISEASES OF THE JOINTS.

There are three classes of joints: Immovable, movable, and mixed. The immovable joints are those which connect flat bones together, such as the bones of the face and head, and are not subject to any special disease. It is the movable and the mixed which we have to deal with, especially those of extensive motion. These joints are connected by binding and capsular ligaments, and the ends of the bones are incrusted with cartilage and the true joints lubricated with synovia, secreted by the synovial membrane which lines the capsular ligament. The true joints are very liable to injuries, and from the nature of their structure very liable to severe inflammation, ulceration, and ossification. It is very common in cities to find old horses which have been subjected to heavy work with several of the lumbar vertebrae ossified. This is caused by the weight on their backs and from slipping. The cartilages connecting the bones are first irritated, then formed into bone, ending in a solidification. The knee is not liable to strains, but is often injured by falls and kicks and other injuries. The term "broken knees" is used when an animal falls and breaks the skin or otherwise injures the knee joint. When it is severe the animal suffers great pain and is very lame.

Treatment: Wash the part and remove all dirt, hair, etc., then bathe it with acetate of lead one-half ounce, tincture of opium two ounces, water one quart. Bathe it three or four times daily. In cases where it is cut deep and the joint water escaping, the horse should be put into slings and the part cleaned and the hair shaved off at least two inches around the wound and gauze cloth saturated with collodion put over the wound and on the shaved part. This should be kept firm with the hand for a few minutes until it sticks fast to the skin. The joint should be splintered and bandaged to keep it from moving. If the joint swells bathe it with cold water several times a day. If the knee has been injured and the skin not broken bathe it with cold water and apply lead lotion after each bathing. After the inflammation has been subdued and a thickening left, blister it several times with biniodide of mercury one dram, lard one ounce. Let it remain on for twenty-four hours, then wash off and apply a little lard. Apply again as soon as it is well from the effects of the first blister. Horses often get soft swellings on the front of the knee and fetlock joints by striking these parts against the manger. Some horses have a habit of pawing while they are eating their oats. I have seen some very bad blemishes from this cause. To prevent this pad the manger by nailing on it a bag stuffed with straw. The animal will strike this instead of the manger. These swellings contain a jelly-like substance, which accumulates under the cartilage of the knee from the constant

striking against the manger or other hard substance. It is very difficult to remove this lump. It makes matters worse to cut into it. It is best to try biniodide of mercury, one dram to one ounce of lard; use as above and continue it for several months. I have seen a great many cases of this kind in the eastern part of the country, where the farmers use pokes on their horses and colts to keep them from jumping over the fences, the constant striking of the fetlock joint against the poke causing the lump above mentioned.

Elbow Lameness.—The tendons of muscles and the ligaments attached to this joint are liable to be sprained by the animal slipping forward, outward, and also inward. When the ligaments and muscles are strained the seat of lameness is easily detected. There will be swelling, pain and heat, and difficulty in moving the leg. When the internal ligament is the part affected the horse will stand with its foot and leg thrown outward. When the animal is made to move it will drop considerably and seem as if it would fall. The dropping is characteristic of elbow joint lameness, even when there is no heat or swelling to indicate that the injury is in the elbow.

Treatment: When there is heat and swelling, foment with hot water, and apply lead lotion after each bathing. If there is no heat or swelling use soap liniment or camphorated liniment to it three times a day and give complete rest until the lameness passes away.

Shoulder Lameness.—There are several kinds of

lameness in the shoulder. First, injuries to the point of the shoulder caused by kicks or falls and bruises; second, strains of the flexor brachii, which passes over the point of the shoulder; third, strains of the muscles upon the shoulder blade known as sweeny. There are also diseases of the shoulder joint produced by rheumatism, causing the ligaments to become thickened, and in this way a stiffness of the joint takes place, and in some cases the cartilages of the joint may become ulcerated and destroy it.

The symptoms of shoulder joint lameness: The animal stands with the knee and elbow bent forward, and resting the leg on the toe, the foot being turned backward, and if the animal is made to move it will drag the toe on the ground, being unable to bring the leg forward. In severe lameness the horse will not throw its leg outward and forward as described by some, as this would cause him too much pain. In cases where it is not severe the animal will stand with its foot solid on the ground inclining backward, and when moved will step short on that foot and show a little lameness, and if made to trot will be very lame, and the leg is not brought as far forward as the other, in some cases not more than half way. In watching the movements, if the horse brings its leg well forward the lameness is not in the shoulder. By lifting up the foot and gently bringing the leg forward the animal will evince pain, as this will put the muscles and joint on the stretch. In cases where there is swelling and heat there is no difficulty in

detecting the seat of lameness, but when the joint is affected there may be great lameness and no outward signs. Usually in sweeny the muscles first swell a little and then waste, the movement of the limb is about the same as in shoulder joint lameness. In severe cases benefit is obtained by putting on a high-heeled shoe so that the horse can rest on it and at the same time have its leg flexed.

Treatment: When there is pain and swelling, with heat of the part, foment with hot water for half an hour three times a day and apply a little of the following lotion after each bathing: Acetate of lead half an ounce, tincture of opium two ounces, water one quart; shake up well before applying. If there is no swelling or heat use a strong liniment such as the compound soap liniment. If this takes no effect apply cantharides one part, vaseline or lard six parts; rub in a little once a week and give the animal complete rest.

The treatment of sweeny: If there is swelling use the lead lotion to reduce it; then use the cantharides ointment above mentioned once every two weeks until it is filled up, which usually takes from two to three months. In connection with shoulder disease we have collar bruises, some of which swell up and fill with fluid, and are soft to the touch; others near the point of the shoulder are hard and solid. In both cases if they are hot apply the lead lotion for a few days to remove the inflammation. Then open the soft one with the knife, making the opening large enough to admit the finger, so that the bruised and disconnected shreds of the connect-

ing tissue can run out; then inject once daily a little lotion made by mixing one dram of chloride of zinc and one pint of water. If there is any thickening left after it heals rub on biniodide of mercury one dram, lard one ounce. Repeat in two weeks. If the lump feels hard and solid make an opening in its center two-thirds the depth of the lump. Then roll up two grains of bichloride of mercury in tissue paper, cone shaped, and press it into the opening with a probe or a small, smooth stick made in the shape of a probe; repeat this every third day. This is by far the best method for the removal of hard lumps on any part of the body; besides causing a slough it stimulates the whole of the tumor, and absorption takes place in it. It may take several weeks to accomplish this, but it leaves no blemish, which is often the case when the lump is cut out. To prevent shoulders from galling see that the lining of the collar is smooth and that it fits well; the shoulders should be examined every night, and if there are any signs of tenderness wash them with water to remove scurfy or matted hair, then rub on a little lead lotion made by mixing half an ounce acetate of lead in one quart of water. This will remove any tendency to tenderness and contract the relaxed skin.

Sores on Top of Neck.—This is caused by pressure of the collar. Take notice that the draft is not too high up, as this will pull the collar downward and bring pressure on top of the neck. This can be remedied by slackening the hame strap at the top and tightening the one at the bottom. In

plowing there will be more tendency to pull downward than in the wagon. If it becomes sore remove the pressure and apply a little of the lead lotion above mentioned several times a day. If it becomes sore and calloused, apply a little biniodide of mercury, one dram, to one ounce and one-half of lard, once a week. This will cause absorption of the callous, then heal it by using oxide of zinc one ounce, vaseline two ounces. It will be necessary to give the animal rest while using the biniodide ointment. In some cases the animal could be worked by using the breast collar. Saddle galls or sores from the back-band of the harness should be treated the same as galled shoulders.

Sprain of the Flexor Tendon (Back Tendon).—Causes: Horses having to draw heavy loads, there is a very great strain on this tendon, as most horses dig their toes into the ground, and horses in cities catch the cobble stones with their toe calkin. This causes great extension of the toe, hence great stress on the back tendon. Injuries such as kicks or knocks from the other foot will cause an inflammation of the sheath of the tendon, causing lameness.

Symptoms: There will be swelling and heat in the parts, there may be bulging of the sheath and the tendon quite normal; when the part is pressed the animal evinces pain, stands with the leg upright, moves stiff and digs its toe into the ground; when the hind leg is the one affected he seems to throw the leg behind him, and the fetlock joint is not flexed, as when the animal is sound. Some-

times the strain may be so slight as not to cause much if any swelling of the part, and the animal will be lame. Examine the well fetlock, then the affected one. This will enable us to detect the slightest swelling, and it may also enable us to detect heat, if any. Slight movement of the foot forward will cause pain to the horse.

Treatment: In severe cases put on a high-heeled shoe. This will elevate the heel and slacken the tendon; bathe the part with hot or cold water for half an hour, and apply a lotion composed of acetate of lead half an ounce, tincture of opium two ounces, water one quart. Do this three times a day. Give complete rest until the animal is better. In chronic cases use cantharides two drams, vaseline one ounce; rub in a little of this; let it remain on for twenty-four hours, then wash it off and apply a little lard. Repeat this every second week until the animal is cured. It can be turned out to grass after the blister is washed off, until two weeks are up, then bring it in and apply the other, and when it is washed off turn out again, and so on.

Sprains of the Suspensory Ligament.—This ligament is situated below the back tendon, and arising from the upper part of the canon bone, it passes down close to the bone. At the fetlock it divides into two branches, each branch becomes attached to the sesamoid bones (two small bones at the back of the fetlock joint). This ligament is sometimes sprained, causing severe lameness. It is also sometimes ruptured (called by horsemen

"breaking down.") The symptoms are very much like those of the back tendon, and the treatment is the same. When it is a case of breaking down the toe turns up, the heel resting on the ground. In this case the back tendon is all right. Few cases of this kind get better.

Strain of the Fetlock Joint.—The lateral ligaments are usually the ones affected, but sometimes the capsular ligament may be involved. The symptoms of this are swelling and some heat in the part; the animal evinces very great pain when the joint is moved, and usually extends the foot. The treatment is the same as the above, only it is not necessary to put on a high-heeled shoe.

Wind Galls.—This is an increased quantity of synovia in the cavity, causing a bulging at each side of the tendon at the upper part of the fetlock joint. They seldom cause lameness, but at times they become hard from a thickening of the walls of the capsule, interfering with the passage of the tendon, causing lameness.

Treatment: In the early stages pads and bandages to cause pressure will often remove them. If not, use biniodide of mercury one dram, lard one ounce; rub on a little with the fingers; let it remain on for twenty-four hours, then wash off. Repeat every second week.

Ringbone.—This term is applied to a growth of bone on the upper and lower pastern bones. When the deposit of growth of bone is on the sides only, they are usually called side bones, but they are of the same nature, and both cause lameness when

they interfere with the joint or the passage of any of the tendons.

Causes: Some horses are predisposed to bony diseases from the least injury, while others are not, and in selecting mares for breeding purposes the former should be rejected; strains, bruises, or injuries to the cartilage of the joints.

Symptoms: When the membrane of the bone or cartilage becomes inflamed there may be great lameness for several months before any enlargement takes place, and it is somewhat difficult to detect. The absence of other diseases of the foot, with some heat in the pasterns, and soreness on pressure or moving the joints. In other cases the enlargement may make its appearance for some time before the horse becomes lame, and in some cases it may never cause any lameness, but should always be looked upon with suspicion, as in the majority of cases they sooner or later cause lameness. Ringbone is more difficult to cure on the fore foot than on the hind one, as the pasterns are more upright on the former than on the latter, and besides, the horse's fore legs have to bear two-thirds the weight of the body.

Treatment: The horse should have rest, and the shoes be removed and the foot pared level. If there is heat in the part keep it wet with acetate of lead half an ounce, to the quart of water, by means of a bandage saturated with it. Continue this for a few days, then apply a blister composed of cantharides two drams, biniodide of mercury

one dram, lard two ounces. Rub on a third of this with the fingers. It is not necessary to cut off the hair if the blister is well rubbed in. Let it remain on for twenty-four hours, then wash off and rub on a little lard. Repeat every second week until three blisters have been applied. Keep the horse's head tied up while the blister is on. The horse should have a few months' rest after the blisters. If this does not cure it, then fire. This is done by cutting off the hair and using the firing irons made for the purpose. Have them red hot, and burn five or six tracks up and down the enlargement deep enough to almost burn through the skin. The iron should be drawn up and down lightly several times, making all the tracks, then going over them carefully until you get them to the desired depth, taking care not to burn the coronary band, then rub on a little lard or vaseline. Nothing more is needed for two weeks. At the end of that time if the marks are drying up and there has been no discharge it will be necessary to rub on a little ointment made by mixing two drams of cantharides with one and a half ounces of lard and rub on a little of that once a day until there is a discharge from the burned tracks. Keep this up for five or six weeks, then let it heal up, and give the animal several months' rest.

Hip Joint Lameness.—Hip joint lameness is very rare in the horse, as this joint and the muscles of the hip are not brought into so severe a strain

as the other joints of the limb. The causes are principally falls or injuries, such as kicks, and sometimes rheumatism.

Symptoms: There will be some swelling, which can be easily detected by standing behind the animal and viewing both hip joints, and if the animal is standing solid on both hind feet there will be no difficulty in seeing the slightest swelling, if there be any. In severe cases the horse will hop and catch in the lame leg. When the animal is moved and while at rest it will usually hold up the leg off the ground, the muscles below the hip supporting the limb. Heat may be felt over the seat of lameness and pain caused by pressure. At first the muscles seem to be elevated, but if it lasts long the muscles soon waste.

Treatment: Give the animal complete rest, and if it rests on the toe benefit will be obtained by putting on a high-heeled shoe; but if the animal holds its foot off the ground, it would do more harm than good from the extra weight of the shoe. In the early stages of the disease bathe with cold water and apply some of the lead lotion before mentioned. In the second stage hot water is the best, and apply a little of the following after each bathing: Tincture of opium two ounces, tincture of arnica two ounces, fluid extract of belladonna one ounce, water four ounces. After all swelling and heat are removed and the animal still lame, blister the part with cantharides two drams, lard one ounce. Let it remain on for twenty-four hours, then wash off and apply a little lard. Repeat in

two or three weeks, if necessary. This blistering with cantharides will draw out the deep-seated inflammation and act as an alterative, bringing a healthy action to the part. No other blister has this action. This I have discovered from practical experience. The horse should not be put to work for some time after the lameness disappears.

Strains and Wasting of Muscles of Hip.—The large muscles of the hip are liable to strains, and there is a great tendency for these muscles to waste as a result of the strain. This is called by horsemen "half hipped."

Symptoms: When these muscles are strained or injured the animal has difficulty in bringing its leg forward, and has the appearance of being stiff in its back. When the animal is at rest it will usually stand solid on the leg of the injured side, as well as on the other. The treatment will be the same as for hip joint lameness.

Strains and Wasting of the Crural Muscles (the Muscles in Front of the Thigh Bone).—These muscles are connected with the patella, the "knee cap." When sprains or injuries to these muscles take place the animal has no power to bring the leg forward, and if made to walk the stifle joint drops down, giving the animal the appearance as if it would fall on that side, and knuckles over at the fetlock joint. After a time the muscles waste and there is a sinking in of the part, and the muscle loses its action, and is partially paralyzed. The treatment will be as above, but benefit may be obtained by giving nerve tonics; nux vomica

two ounces, sulphate of iron four ounces; mix and divide into twenty-four doses, and give one morning and night in bran mash. I have had a number of cases of this form of lameness and all have gotten well by the use of the cantharides blister and the nerve tonics.

Stifle Joint Lameness.—Stifle joint lameness is characterized by the inability of the animal to bring its leg forward, that is when the injury is severe and in the neighborhood of the patella, "knee cap." This can be easily understood. To bring the leg forward or backward the stifle bone moves on a pulley-like surface at the lower end and in front of the thigh bone, and an injury to this part or dislocation makes it impossible for the animal to use this joint. It may be standing on its foot, but more often with the leg a little backward, and if made to move forward will do so on the three legs, while the injured one will be held out straight behind. Some horses will, by the aid of the muscles of the hip and thigh, bring the leg forward in a circular motion, keeping the stifle joint straight. If the animal can stand with its foot forward there will be no use looking for the lameness in this joint. I mention this because I have found so many horsemen locating the lameness of the hock, foot, and other parts of the limb, in this joint. The stifle joint is liable to injury from a horse kicking its neighbor in the stall, especially in cases when the partition between them is too short. I have seen many valuable horses destroyed in this way. Some horses when

not feeding stand back in their stall, thus giving their neighbors the opportunity of kicking them if so inclined, and the stifle or its vicinity is usually the place injured. Severe injuries to the stifle joint are often dangerous to the life of the animal. I have seen several cases of death from a severe form of inflammation in the joint, terminating in mortification. All injuries to this joint should be treated with great promptness in case of the above result. Give the animal complete rest, and keep the part constantly wet with acetate of lead half an ounce, water one quart. If there is great pain add from one to two ounces tincture of opium to the lotion. After all inflammation is subdued and the animal is still lame apply a blister of cantharides two drams, lard one ounce; rub this on the outside of the joint only, as the skin on the inside is very thin and tender. If it is necessary to use it on the inside it should be reduced in strength by one-third. If matter should form it is best to let it break of its own accord, then foment it with warm water, and inject warm water to clean it out, after which inject a teaspoonful or two of a solution of chloride of zinc one dram, water one pint. Do this twice daily. If there should be a soft swelling left after it is healed, use biniodide of mercury one dram, lard one and one-half ounces; rub on a little of this every second week for a month or two.

Cramps of the Muscles of the Thigh.—This affection I have often seen in the trotting horse. A well-marked case of this kind came under my

notice a few years ago. A five-year-old stallion was tracked for a month with the intention of putting him into the fall races. After being driven one or two heats, all at once he would go lame in one hind leg, so lame at times he could not be moved off the track. After resting for ten or fifteen minutes he could walk fairly well, and in half an hour's time would be as well as ever, and might trot several times around the track all right; but if put to his speed after trotting for a while the same thing would take place. I was requested to examine the horse. I found him at rest and could not discover anything wrong, so I had him speeded. He went twice around all right, but after passing the first quarter pole he went on three legs. I was at his side as quickly as possible, and found the large muscles of the back of the thigh badly cramped and as hard as iron. In a few minutes they began to relax and the animal was able to walk to his stable. I considered this was caused by the nerve supplying these muscles being deranged in some way by the driving, as it required violent exercise to develop it. I ordered the animal to be rested for a couple of months and to have one dram of powdered nux vomica and one dram sulphate of iron once daily in a small bran mash. The animal was then put on the track again and did good work for three weeks, when the old trouble showed itself again. The animal was then taken off the track for the winter, during which he did some moderate driving. In the following season he was put on the track, and as long as I knew

him he did good fast work, without showing any symptoms of his old affection. I have had several cases of the same kind, and the only remedy is to give a long rest, with iron and nux vomica. Give for two weeks, then skip two, and give again, and so on.

Cramps of the Stifle Muscles.—Young horses and colts are subject to cramps of the stifle. The symptoms are: The animal stands with the leg fixed to the ground or extended out behind him; while the cramp lasts the animal cannot move its leg. It comes on and goes off suddenly, or in some cases it lasts for several days. Prof. Williams, of Edinburgh, says that it is caused by indigestion and that a good physic will remove it. If the animal is subject to it it will be well to give it a dose of physic, aloes one ounce, ginger one ounce, carbonate of soda one ounce; dissolve in half a pint of boiling water, add half a pint of cold water and give at one dose; half this quantity for a colt from one to two years old. This trouble seldom requires any treatment. In those cases which last more than an hour or two give bromide of potass. in one-ounce doses three times a day in a small bran mash, and rub the muscles around the stifle twice a day with camphorated liniment.

Diseases of the Hock (Bog-Spavin).—This joint corresponds to the ankle joint in man and is the one in the horse most liable to injury. This joint has what is termed true and false joints. The true joint is where it articulates with the lower end of the tibia and upper surface of the astragalus.

The false joint is that between the lower end of the astragalus and cuneiform bones. The last-named is only a gliding and has no hinge motion like the upper one and is the seat of bone spavin. There is a baggy ligament called the capsular situated in front and inside of the hock joint. The use of this ligament is to protect a very delicate membrane which secretes the synovial fluid (joint oil), to lubricate the joint. When this ligament and its membrane become irritated from strains, bruises or other injuries, it is apt to secrete too much joint oil, and the result is that there is a bulging of the ligament. This is what constitutes what is called bog-spavin. This is a very common trouble among heavy draft colts, and sometimes adult draft horses, as they usually have big, loose joints and a number of them have crooked hind legs, although it may occur on any kind of hock.

Symptoms of bog-spavin are more or less bulging in front and a little to the inside of the hock joint. It seldom causes lameness and may appear suddenly or by degrees. If there is lameness the other structures will be affected. There will be heat and pain and a stiffness of the joint.

Treatment: When heat and soreness present themselves bathe several times a day with cold water and apply a little lead lotion after each bathing, half an ounce of lead acetate to the quart of water. After the heat has subsided or in cases where there has been no heat or soreness use biniodide of mercury one dram, lard one ounce. Rub

on a little with the fingers, let it remain on for twenty-four hours, then wash off and apply a little lard. Repeat every second week and continue it for several months if necessary. It usually requires a number of applications to remove it. Keep the animal in the stable and tie up his head so that he cannot get his mouth to it until the blister is washed off. The horse can then be turned out to grass until it is time to put on another blister.

Thorough-Pin.—Thorough-pin is an enlargement situated on the sides and upper part of the hock joint, arising from disease of the sheath of the back tendon. The fluid with which it is filled can be pressed from one side to the other; hence the term thorough-pin. It is of the same nature as bog-spavin, and is caused by strains or other injuries. Short, upright hock joints are more liable to thorough-pin than well-formed ones. They seldom cause lameness and are only blemishes. They can sometimes be removed by the same treatment as that described for bog-spavin. Puncturing has been recommended, but cases which I have seen usually fill up again. Williams says if a puncture is to be made at all, it should be at the bottom of the swelling, sufficiently large to allow the complete removal of the fluid, and it should remain open for some days. No fear need be entertained, although signs of pain and fever may ensue, as an open bursa is not so serious as an open joint. I think, as it does not cause lame-

ness, and in the majority of cases it can be removed by the blisters, that it is safer not to operate.

Bone-Spavin.—Bone-spavin may be defined as an exostosis (growth of bone) on the inner and

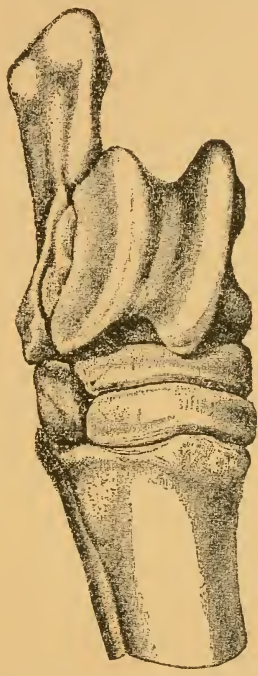

PLATE 5. NATURAL HOCK-JOINT.

lower part of the hock, arising from inflammation of the small bones of the hock terminating generally in anchylosis of one or more of the gliding joints of the hock, according to Prof. Williams. The reason why spavin appears on the inside of the hock and seldom on the outside can be explained.

The inside of the leg is more under the center line of gravity, and therefore greater weight is thrown upon the inside of the joint and is more likely to be sprained on that account. Spavin seems to be a disease peculiar to the horse, as it is seldom that

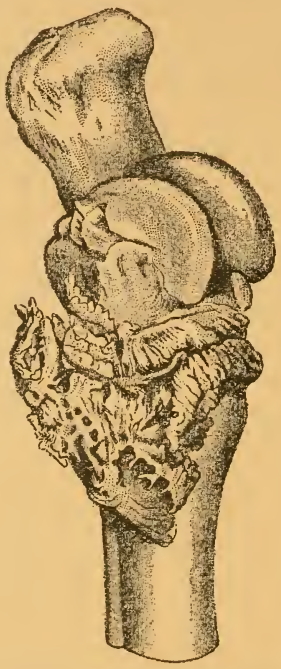

PLATE 6. SHOWING SITUATION OF BONE-SPAVIN.

we find it on working oxen, no matter how roughly they are used. Spavins are caused by local injuries, such as sprains, bruises, and kicks. Some breeds of horses have a hereditary tendency, whether they have a well-formed joint or not. The slightest injury to some horses will produce a

bony deposit on some of the bones of the leg; such as splints, ringbone, and spavin. Animals having this tendency should not be used for breeding purposes. A crooked, badly-formed hock joint is more liable to spavin than a well-formed one, providing that the well-formed one has no hereditary tendency. There are two forms of spavin, one of which forms on the outside of the bones. The other first affects the cartilage of the joint, and will cause lameness for a long time before it shows any external enlargement. The enlargement on the outside may show itself for some time before it causes lameness.

Symptoms of spavin: Often the first thing noticed wrong is that when the animal is made to stand over in its stall, it will give a hitch on the sound leg. When it is taken out it may not show any lameness, or if it does it may only be for the first few steps, but by and by it takes longer time to pass off. Every time the horse is stopped for a few minutes it will start off with a hitch, until finally the animal becomes very lame, and may be lame all through the journey. Another early symptom is that every time he is stopped he will rest the toe of the affected limb. The method of examining a horse for spavin is to let it cool off in the stable, then back it up, and if there is anything wrong with the hock joint it will require some urging to get it to back, and when it does so it will bring the toe of the sore limb to the ground before the heel, and hitch on the well leg. Take the horse out and make it stand solid on its hind feet,

then look through between its fore legs and see if the joints of the hock are the same. If you cannot discover anything, then stand at the horse's shoulder and look to the opposite hind leg, then do the same on the other side, and see if both joints are the same from that direction; then rub the hand down over the well one first, then over the suspected one to feel if there is any difference. If none is found, then you may conclude that the horse has what is termed an occult spavin; that is, the kind of spavin in which the cartilages between the bones are affected. To detect this form of spavin it will be necessary to take the horse out on the road. One man takes him by the halter, and has him ready to start on the trot when wanted. The examiner lifts up the lame leg. If it is the right hind leg he will put his right arm on the inside of the leg, the point of the hock resting under the arm-pit. Then clasp both hands around the flexed fetlock, then press on the point of the hock with the arm-pit; at the same time the arms will brace the fetlock joint. Then by moving the leg backward and forward you will bring considerable force on the hock joint, then drop the leg and start the horse off on a trot, and if the hock is the part affected it will start off very lame, or in some cases on three legs. If this is properly done it will indicate to you without doubt that the lameness is in the hock joint.

Treatment: A number of cases of bone-spavin can be cured. Those that are low down on the joint are usually curable. Those high up, involv-

ing the true hinge joint of the hock, are incurable. In the early stages, where there is acute inflammation, give complete rest and apply cold water constantly for several days, then apply cantharides two drams, biniodide of mercury one dram, lard two ounces. Mix and rub in well a little with the fingers. Let it remain on twenty-four hours, then wash off and rub on a little lard. Repeat every second week until three or four blisters have been applied. Give at least three months' rest. If this has not cured it, it will be necessary to fire it. This is done by cutting off the hair and heating the iron to a red heat and burning a straight mark from the top of the hock to the bottom; then make three or four marks from the center one like a crow's foot. These marks or lines should be burned deep enough to almost cut through the skin, but not altogether. In firing the iron should not be pressed but rubbed upward and downward; the weight of the iron is enough. When the operation is completed rub on a little lard; that is usually all that is needed. I have operated on a great number of horses for ringbone and spavin and find that what is called the smooth iron is the best. About nine out of every ten cases get well if properly fired with the smooth iron. In two weeks after the operation has been performed if it should be drying up and showing no signs of matter forming rub on a little cantharides blister; but if it is sore and a little matter has formed, let it alone. I like to keep it sore for five or six weeks, then let it heal up of its own accord. Allow the animal several months'

rest, either in the pasture or loose box. In some few cases which did not get over their lameness I have fired a second time. This should not be done inside of one year.

Curb.—This is an injury or sprain to the calcaneo-cuboid ligament. This is an elastic ligament which extends from the back part of the point of the hock to the head of the canon bone. This elastic ligament is placed there to strengthen the hock joint, and is very liable to strains, especially holding back heavy loads going down hill, or backing up heavy loads, or the hind legs slipping too far under the animal. It is caused by kicks or by the whiffletrees striking against it. Some horses have what is called curby hocks. That is, the back part of the hocks round out. This must be distinguished from curb. When the enlargement is on the belly of the tendon it is much easier removed than when it is on the part where the tendon is attached to the bone. The reason of this is that when it is injured in this part the bone is likely to be injured also, and instead of having a soft bunch there will be a hard, bony one. In treating curb this has to be taken into consideration. Curb often causes lameness when it first comes on, and there may be considerable inflammation in the surrounding parts, causing swelling. There are other cases which do not cause lameness.

Treatment: In the cases where there is inflammation, keep the animal in the stable, and put on a high-heeled shoe. This will raise the heel and

slacken the ligament. Then put on several thicknesses of cloth around the joint and keep it constantly wet with acetate of lead half an ounce, tincture of arnica two ounces, water one quart. In a few days this treatment will remove the inflammation and the lameness. If there is any enlargement left, blister it with biniodide of mercury one dram, lard one ounce. Repeat in two or three weeks if necessary. If there is no inflammation blister at once. If it is down where the tendon is attached to the bone and is hard use cantharides two drams, biniodide of mercury one dram, lard two ounces. Apply a little of this every third week and continue it for several months if needed. I have had a number of cases in which the first blisters seemed to have no effect in reducing the lump, but by continuing it for several months absorption took place and the enlargement disappeared. In cases where animals have a natural curby hock and it does not cause lameness it is best to let it alone, as it is not at all likely that it can be removed; it is only a loss of time and torture to the horse. The disease of the back tendons and fetlock joints are the same as on the fore legs.

Injuries to the Hock Joint.—The hock joint is very liable to injuries from being kicked by other horses, and is also liable to sprains, which often set up violent inflammation, with great swelling and lameness, and if not treated in time will form matter, and in some cases destroy the joint or cause the death of the animal. No matter what has caused the injury, we should aim at keeping

down the inflammation. This is best done by putting the animal in a loose box, or in very bad cases putting the horse in slings. Then take the leg of a pair of pants and draw it over the foot and up over the hock joint. Take a piece of wide elastic and cut it the proper length to go around the leg, then sew it and put it over the upper part of the pants leg. This will give when the animal bends its leg, and will not slip down. Then fill in between the pants and the leg with soft cotton, and tie below the hock. Keep this constantly wet with lead lotion, half an ounce of the acetate and half an ounce of sulphate of zinc to the quart of water. At the end of the third day if there is no improvement, then use hot fomentations and poultices of linseed meal. If matter should form let it break of its own accord, and when it does clean out the openings with warm water and inject a little of the following: Chloride of zinc one dram, water one pint. If there is much lameness at this stage apply a cantharides blister, one part of cantharides to four of lard. This can be applied every second week. It will remove the soreness and stimulate the part into a healthy condition. The animal should get half an ounce nitrate of potassium in a bran mash if there is much fever.

CHAPTER XX.

DISEASES OF THE FEET.

A better idea of the diseases of the foot can be had by some knowledge of the substances which enter into its construction. The soft parts of the foot are protected by a horny box called the hoof. The hoof is divided into three parts, viz., the wall, sole, and frog. Each of these has a separate function to perform, but all unite in protecting the sensitive parts of the foot. The wall is composed of a multitude of fibers which run from the top of the hoof to the sole, with which it unites. The external layer is hard and covered by a cement substance, which prevents the escape of moisture; also prevents moisture from penetrating into it. The next layer is a little softer, while the internal surface is composed of a great number of plates called the horny laminae, which correspond to the sensitive laminae. The wall receives the substance, which develops it from the coronary band or ligament, which is situated at the top of the wall in the same manner as our nails. Anything which interferes with the health of this band prevents the healthy growth of the wall, hence a dry, brittle hoof. The horny sole resembles the wall, only instead of fibers it is composed of plates in layers. These plates are developed from the sensitive sole. They

are soft at first, and gradually harden as they approach the surface. In some cases the surface layer may have a mealy appearance, the outer layer is constantly wearing off, and new ones forming. In a well-formed foot the sole is strong and arched to give strength to the wall, and also to protect the sensitive sole from injuries. In cases where nature has only formed a thin, weak sole, or where it has been reduced in thickness by the blacksmith's knife, it is then not in a condition to sustain the pressure it was intended for, and as a result the whole foot suffers, and the horse becomes lame. The bars at the back part of the sole unite with the wall at right angles, forming a strong support to the wall, and also to the sole, preventing contraction of the heels. The frog is the prominent, somewhat pyramidical, spongy mass of horn lodged between the bars, and filling up the triangular space. The frog varies in shape and size, but is always well developed in a well-formed foot. There are three cavities, called the clefts of the frog. These clefts allow the elastic or spongy elevations of the frog to expand on pressure. It is secreted or grows from the sensitive frog. The use of the frog is to lessen concussion and bear a little of the weight of the body, and if this frog is not large or is cut down so that it does not come in contact with the ground, derangements of the other structures soon ensue.

Soft Structures of the Foot.—These are the lateral cartilages, sensitive laminae, sensitive sole, sensitive frog, and the coronary band or ligament.

Beneath these substances are the hard structures, viz., the coffin bone, navicular, and the oscorone (lower pastern). These bones are held together by ligaments, and are clothed by the sensitive substance mentioned. The lateral cartilages are two thin plates of clear cartilage in the middle, and a mixture of fibers and cartilage toward the borders. They are attached to the wing of the coffin bone, pass down over the sensitive frog, and project upward to the coronary band. They act as braces to the heels.

The Sensitive Laminae.—This is continuous with the coronary band, and is attached to the coffin bone by a dense fibrous membrane. It is composed of a number of very highly organized plates, composed largely of blood vessels, nerves, and lymphatics, held together by a very fine network of fibrous tissue, and is attached to the horny laminae interposed between the plates. This is the most sensitive structure of the body, and is the part affected in founder.

The Sensitive Sole.—This is continuous with the sensitive laminae and frog, and is firmly attached to the inferior surface of the coffin bone. Like the sensitive laminae it is made up of a highly vascular, fibrous membrane, and is covered by the villi, which secretes the horny sole.

The Sensitive Frog.—This is situated beneath the horny frog, and is made up of an intermixture of yellow fibro-cellular tissue of a peculiar elastic nature, and has been described as fat. It is not nearly so sensitive as the structures just men-

tioned. It is covered by a layer of villi which secretes the horny frog.

The Coronary Substance, or Band.—This is the vascular structure situated on the upper border of the wall. It consists of a dense fibrous band, which is connected with the coffin bone and the extensor tendon by dense fibrous tissue, on which reposes a plexus of blood vessels,covered by a mod-

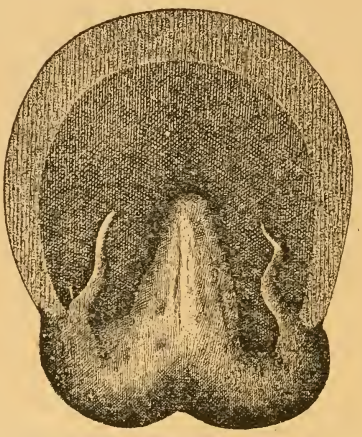

PLATE 7. SHOWING THE FOOT PREPARED FOR THE SHOE.

ified form of the skin, containing a number of little projections, which enter into funnel-shaped openings in the crust. The horn is secreted from this part.

Shoeing the Horse.—As horses' feet were made before roads, it was necessary to contrive something which could be put on the feet to protect them from breaking up or wearing down too fast. There has been a great deal written on this sub-

ject, and a great deal of it has been based on false ideas; such as considering the hoof to be an elastic box, and that paring and thinning down the sole, cutting down the frog, and cutting the bars, etc., would allow it to expand. This method the majority of blacksmiths follow, resulting sooner or later in the destruction of the foot. Some main-

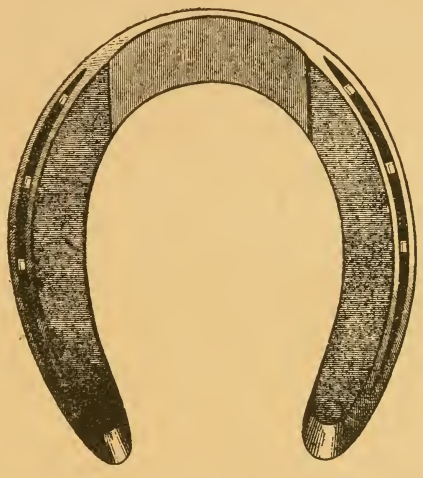

PLATE 8. BEST FORM OF SHOE FOR A DRIVING HORSE.

tain that high calkins at the heels are useful to relieve the back tendon, others that the feet should be kept soft by stuffing with clay, linseed meal and other stuffs, all of which are unnecessary, if not hurtful to the healthy foot. Without commenting on what others have done, I will give you my experience founded on facts and practiced to the advantage of the horse and to the satisfaction and profit of the owner. As we have already seen

by the construction of the horse's hoof and its use, it is only necessary to follow nature. In order that a healthy foot should be shod and kept healthy it is first essential to abolish the drawing knife and do away with the calkins and toe pieces. This can be done in the case of the driving horses, which have light work, and horses on the farm. Heavy draft horses in the city must have calkins on their shoes to prevent them from slipping on the stone pavement, although it is injurious to the feet, but it is unnecessary to use the knife on them, and this, the worst of evils, can be averted. The proper system of shoeing is to take a rasp and level the wall, so that a margin of the sole will bear on the shoe. Have the bearing surface for the shoe about three-quarters of an inch at the toe and not more than half an inch at the heel. On this level surface put on a level shoe, at least three-quarters of an inch in width at the toe and half an inch at the heels. The shoe should be no thicker at the heel than at the toe, the nails should not be driven too high, and for the horse of light work four nails on the outside and three on the inside are sufficient. The rasping on the outer surface should not extend above the nails, as it would destroy the enamel, which was mentioned was there for the purpose of preventing evaporation from the foot and moisture from getting into it. A horse shod in this way has all parts of its feet left which are needed to support the weight of the body. Williams says: "Experience and anatomical investigation points to the con-

clusion that the sole as well as the wall is intended to perform this weight-bearing function." This principle of shoeing I carried on for thirteen years on the artillery and cavalry horses under my care, and during that time the draw knife was never used. The result was we had no lame horses. The majority of them had as sound feet at the end as they had when first purchased. On the other hand I will give you a description of the ordinary method. The blacksmith takes his knife, pares out the sole until he can bend it with the pressure of his thumb; then he cuts down the frog, opens out the heels, as they call it, then applies a hot shoe to the wall to burn the part where the shoe is not level, and these parts are cut down to fit the shoe instead of the shoe fitting the foot. This shoe is usually beveled, except a small bearing surface at the heel, where it is level, and has a wider bearing surface. This shoe is then nailed on and the hoof rasped up to or near the top, thus destroying the enamel. This the smith calls a neat job. The result of this is, the horse has to support all its weight on the wall, the sole taking no part. The beveled part of the shoe soon sinks into the wall, and a great deal of pressure is brought to bear on the heels, resulting in corns. The animal having to sustain its weight on the walls, they are more or less pressed upward, straining their attachments with the sensitive laminae, and probably pressing on the coronary bands. This does not often cause lameness at first, but it is sufficient to interfere

with the healthy functions of the hoof, resulting by degrees in dryness of the hoof and a little fever in the feet, which goes on from bad to worse until the animal becomes what is called tender footed, and finally a cripple; but in some cases the horse is ruined at the first shoeing. As an illustration: Col. J. bought a good, sound mare, four years old, broken to drive and ride, but never had shoes on. She was sent to the shoeing smith, and on account of the animal belonging to the colonel and the mare a fine one, he shod her in what he would call a neat, fancy way. The next day the colonel rode her a few miles, and on returning he noticed that she flinched, but he attributed it to her not being used to the saddle. He got off and walked part of the way home, and when he arrived there he ordered her back to be washed and a soothing liniment applied. The next morning she could not be moved in her stall. The smith was sent for, and said the trouble was in the shoulders and would pass off in a day or two. It did not pass off in three days, and I was sent for. I found the animal suffering from a very severe attack of laminitis (founder), from the result of thinning out the sole, so that all the weight was on the walls, resulting in affecting the sensitive laminae to such a degree as to cause inflammation of it, as well as bruising the sensitive sole. The animal was treated, but it being a very severe case and not attended to in time the inflammation had done its work of destruction. In order to keep your horse's

feet healthy never allow the smith to use the knife nor put calkins on the shoes, and barring accident you will not be troubled with bad feet.

Disease of the Superior Part of the Coffin Bone. —This form of disease may happen to either the fore or hind feet, the result of blows and treads by the other foot, especially if it is shod with shoes with long, sharp calkins, or from over-extension of the front tendon at its attachment to the bone.

Symptoms: There will be lameness, and by and by a swelling appears at the top of the hoof in front. It is very tender and hot to the touch, will vary in size from that of a bean to a pigeon's egg. The animal puts its heel to the ground first in order to save the front. Matter usually forms, and the part sloughs, leaving an angry sore, which is very difficult to heal. In some cases after the lameness the first thing noticed will be a discharge of a thin, watery matter from the top of the hoof.

Treatment: If the animal has a high-heeled shoe have it removed, as the heel should be kept as low as possible. Foment the foot with hot water and put on a linseed meal poultice for a few days, and if matter still keeps discharging and the part bulging upward and extending over the hoof, cut away a little of the hoof with a sharp knife. If the hoof presses on the tender part it will increase the pain. Then roll up two grains of the bichloride of mercury in a small piece of tissue paper and press into the wound. This will cause a slough, in three days destroying the unhealthy tissue. This will relieve the animal and leave the part in

a condition to heal. Then use chloride of zinc one dram, water half a pint. Inject a little of this twice a day. After it heals if any lameness should remain use cantharides two drams, lard one ounce. Rub a little of this around the coronet, let it remain on for twenty-four hours, then wash off and apply a little lard. Repeat in two weeks if needed.

Ossification of the Lateral Cartilage (Side Bones).—This disease is most often found in the heavy draft horses, caused by slipping on the stony pavement and the great weight of their bodies. It is also caused by treads and bruises. A very common cause is the tongue of the wagon being allowed to fall down when the horses are unhitched, and in some cases this will fall on the side of the foot, injuring the cartilage. When unhitching horses from wagons the tongue should be let down with the hand, and thus save the animal the pain of the tongue striking the foot. The progress of this disease is often very slow, and there may be considerable swelling of the part, and yet there may be no lameness. In this case it is only the upper part of the cartilage that is affected. As the disease extends downward underneath the hoof it then causes pressure on the soft parts, causing pain and lameness.

Symptoms: Usually the first thing noticed is a slight hard swelling either on the inside or out, or both, just above the hoof, near the heel. If it is causing pain and lameness the horse will bring the toe to the ground first, and while standing will

likely point the foot, resting on the toe, thus easing the heel. If the hoof is struck lightly over the region of the cartilage the animal evinces pain. In bad cases the hoof will bulge a little in this part from the growth of the cartilage underneath it. This is a very difficult lameness to cure.

Treatment: If there is much inflammation apply cold water bandages for a week or two; then apply a cantharides blister, two drams to the ounce of lard; rub it in well, and let it remain on for twenty-four hours; then wash off. Repeat every second week. If this does not remove the lameness in two or three months then fire it, burning three or four marks on it up and down, taking care not to burn the coronary band. Give the horse several months' rest.

Contraction of the Foot.—This is not a disease, but the result of disease. Whatever interferes with the health of the foot usually causes a wasting of the soft structures, and as a result the hoof follows. It is therefore impossible to get the hoof to contract if the substance underneath it is healthy. It is a law of nature that the hard part gives way to the soft. There is no more danger of the hoof of a healthy foot contracting than there is of the bark of a healthy tree contracting on its substance. Neither will the dry weather nor the heat of the sun have any effect on the hoof of a healthy foot, so therefore follow nature's steps and you will not be troubled by contraction.

Treatment for contraction: Remove all causes, if that be possible; if not there is no cure for it.

A horse with a contracted foot may be helped by putting on a bar shoe, poulticing the foot for two weeks with linseed meal, and applying a blister of cantharides to the coronet and giving several months' rest. To prevent contraction see that your horse is shod as directed, and do not keep it standing long on a hard floor whether it has shoes on or not. Horses were never intended to be kept on hard floors. The best kind of floor is made in this way: Dig out a foot of the earth and fill it up with broken stones or brick, then put on six inches of clay and six inches of sand. This makes a good, cool, soft place for your horses to stand on when not at work, and by spreading some bedding on this it is very comfortable for the horses to lie down on. The stone or brick foundation keeps the place dry, and the earth on top is cool, dry and soft.

Navicular Disease.—This is a disease of the navicular bone and the structures surrounding it. It is called "coffin joint lameness." This bone is situated at the back and inferior part of the coffin joint, and acts as a pulley over which the flexor tendon of the foot passes.

Causes of this disease: Horses with upright pasterns are most liable to it, as more weight is thrown on this joint; horses shod with calkins on their shoes, preventing the frog from coming into contact with the ground, therefore causing a shock to this joint. Some horses have hereditary tendency to this disease. Nails penetrating too deep through the sole, or anything that will cause in-

flammation of this joint, is likely to produce navicular disease. The most prolific cause is bad shoeing. By degrees the inflammation in a chronic form extends to other parts, causing a shrinking of the soft parts, resulting in contraction of the foot.

Symptoms: The lameness may appear suddenly and perhaps immediately after the horse has been shod, and is then usually thought to be the fault of nailing on the shoe. It is likely in this case that the smith has pared the sole and frog too thin, and that the part has suffered from a bruise by the horse stepping on something hard. After a rest it may disappear, to return after the next drive.

Sometimes the disease is of very slow progress in one or both fore feet. The first thing that is noticed is the animal points its toe, and if both are affected, first one, then the other. The animal may not be lame, but it does not step out as well as it used to, and by degrees it gets more tender until it begins to go lame, and gradually gets worse. There is a form of this lameness where the animal shows stiffness and lameness when first taken out of the stable, but after being driven for a short distance it passes off, and after it stands for a while it will start off lame again. If this disease lasts for some time the muscles of the chest and shoulders seem stiff and may shrink. This has been called "chest founder" by horsemen. This is brought about from the soreness of the feet. The horse is afraid to step out, giving it the appearance of being stiff; the muscles of the chest and shoulders will shrink from want of proper action, caused

by the feet being sore. If there is heat and tenderness in the hollow of the heel or a redness of the sole, and the absence of any other disease of the foot or leg, we may consider with almost a certainty that it is a case of navicular or coffin joint lameness. The result is contraction of the foot.

Treatment: Take off the shoes, so that the frog will rest on the ground, then poultice the feet with bran, made up with cold water if it is a recent case, but if it is of some months' standing hot water is the best; the poultices to be put into bags made a little larger than the foot; about two inches deep of the bran mash should be put into the bag, then put the foot in and fill in all around as high as the fetlock, and tie it above the fetlock and around the ankle to keep the bag well on the foot. Wet this several times a day and change it once daily. Continue this for two weeks, and see that it is properly done; if not it will be of no service. Then blister the coronet with cantharides two drams, lard one ounce. Repeat in three weeks, and give the animal a long rest. I have never seen any good result from the use of frog setons, and it is a cruel operation. The operation of neurotomy (cutting the nerve) has been tried and is sometimes useful when the foot is in a good condition for such an operation, but if the animal has a weak foot or if the disease is far advanced it is worse than useless, as the animal will soon pound it to pieces.

Laminitis (Founder).—Inflammation of the foot, called laminitis, or founder, is a very common disease among all classes of horses. The structures

affected are the sensitive laminae and the sensitive sole, and in very severe cases the coffin bones.

Causes: Some horses have a hereditary tendency to this disease by inheriting badly formed feet, bad management of the feet, over exertion, drinking cold water when the animal is heated; horses standing for a long time in railroad cars, where they are obliged to brace themselves to keep from falling, thus throwing great weight on their feet; horses driven on hard roads when the soles of their feet have been pared thin, or from the shoe bearing too much on the walls of the foot; standing in cold water after being warm, standing too long on a hard floor without exercise, too much of any kind of food, small quantities of wheat or rye; sometimes one quart of wheat will founder a horse. It is also caused from diseases of the stomach, bowels, lungs, and from influenza. If this disease is not properly treated there are several conditions which may take place as a result of this disease. The changes which take place in the foot are: First, exudation, the result of the inflammation, usually at the toe, the foot being more supplied with blood vessels at this part. The exudation may take place between the membrane covering the bone and the bone itself, causing an incurable lameness, and sooner or later the complete destruction of the foot. In other cases the exudation may become absorbed, and by degrees the foot becomes healthy. Second: Shrinking of the sensitive substance takes place, causing contraction of the foot and permanent lameness. Sometimes the

toe of the coffin bone presses downward on the sensitive sole, interfering with the secreting process, rendering the horny sole weak, dry, cheesy or spongy, and not strong enough to protect the sensitive parts within. The outer horn of the wall becomes ribbed on account of the secreting surface of the coronary band being interfered with. The ribs or rings of founder are very irregular, and run together toward the front of the foot. Generally the disease is confined to the fore feet, but all may be affected, or only one hind foot, the result of long standing on it on account of some injury to the other foot or leg. When a horse has a sore foot or a very lame leg the shoe should be removed from the well foot and the animal encouraged to lie down as much as possible, or have it put into a sling so as to rest the well foot in case it should become affected by laminitis. I have seen many bad cases from this cause.

Symptoms: The pain a horse suffers from an acute attack of laminitis is agonizing and persistent, as the sensitive part of the foot lies between the bony structures on the inside and the unyielding hoof; and as it swells by its blood vessels being gorged with blood, it has no room to expand, and this pressure of the nerves causes intense pain. The animal stands in its stall breathing fast and heavy, and the nostrils are dilated. If the fore feet are the ones affected they will be stretched out in front, resting on the heels, and the hind feet brought well forward under the body, and the back will be arched. It stands in this way in order to

take as much weight off the feet as possible. If an attempt is made to move him he may sway his body backward and forward, but will not move his fore feet. If he is compelled to do so he will drag them on the heels. I have seen cases where it was impossible to move them back in their stalls. If much pressure was brought to bear the animal would fall rather than move its feet. In first looking at a horse suffering from acute founder it might be mistaken for congestion of the lungs by the heavy, fast breathing and the dilated nostrils, but no mistake need be made, as in founder it is not willing to move, while in congestion of the lungs it will move readily. The pulse in founder will be full and bounding, while in congestion it will be very weak and fast, and in some cases imperceptible. It has also been mistaken for injury to the back on account of it being arched, but in this case the fore feet would be placed well under the belly. The pulse is usually from sixty to eighty, prominent, full and bounding; the appetite is impaired, and in very severe cases the animal will not eat; on examining the feet they will be found hot to the touch. In some cases the animal will lie down upon its side with its legs outstretched for hours. In other cases, especially in the early stages of the disease, it will stand persistently. When the hind feet only are affected the horse will stand with all his four feet together, the fore ones pushed well under its body, the hind feet extended forward, in order to throw its weight on the heels. We might think that the hind feet are af-

fected, that they would be stretched out behind, but in this way the animal would have to bear its weight on the toes, which would augment its suffering. When compelled to move, as soon as its toes come in contact with the ground, it takes a sort of jump forward, probably taking three or four jumps before it stops. The animal does not stand much when the hind feet are affected, and seems to get relief as soon as it is in a recumbent position. The relief is so great when the animal gets off its feet that the pulse will often fall ten to twenty beats per minute in the course of a quarter of an hour. When all four feet are affected there will be a combination of the foregoing. All the feet will be found hot, and tender if struck gently with the hammer.

Treatment: Remove the shoes and clean all mud and dirt from the feet. Then get two bags made a little larger than the foot and long enough to reach above the fetlock. Make up a pail of bran with hot water, put about two inches of the mash in the bottom of the bag and put it on the foot, then fill in with bran as high as the fetlock joint and tie it above the joint, also around below it to keep the poultice well in place. Wet this several times during the day and change it once daily, as if kept too long on it will sour. The poultice should be kept on the feet until all soreness has passed off. Give from the beginning one ounce nitrate of potassium in the drinking water or small bran mash three times a day. Also give in bad cases twenty to thirty drops tincture of aconite in a little water

every two hours until the pulse is reduced in strength and frequency. Encourage the animal to lie down, as the recumbent position relieves it very much. If the animal will not lie down of its own accord, take a rope and put it under its belly and let a man stand on each side and press the rope tight against its belly, and by degrees the animal will try to rest on it, and when it does so let the rope go and the animal will drop down. When once down it will likely remain so for several hours, as it feels the relief thus obtained, and after this it will lie down when it feels like it. It is recommended by some after the shoes are removed and the foot pared, to stand the horse in a tub of hot water, his head being tied so that he cannot get out of the tub. I consider this a very useless method and a very cruel one. To illustrate: Mr. B. had a fast trotting horse, which got an attack of laminitis from drinking cold water when heated. It was found in the morning in a very bad condition. A veterinary surgeon was called in (who had been taught the tub treatment). He had the horse's shoes removed, the feet pared out, and put into the tub of hot water and tied, and a groom to watch him. By evening the horse was so much worse that the owner thought he would die. I was called, took the horse out of the tub, put the slings under him, and as soon as he leaned his weight on the sling I let him down. When the poor animal was down it seemed very much relieved. I then put warm poultices as above directed and gave the animal a few doses of aconite to assist in the re-

duction of fever. In two hours the pulse was reduced from one hundred to sixty. The animal remained down all night. In the morning it got up and ate, and under the above treatment made a good recovery. The tub treatment is to be condemned as cruel, and the softening of the hoof which it is used for can be accomplished much better and quicker by the warm poultices and allowing the horse to lie down. At the end of two weeks, if the animal has been properly attended to, it will be as sound as if the thing had never happened. If there should be the least sign of tenderness of the feet blister the coronets with cantharides two drams, lard one ounce. After it has been on for twenty-four hours wash it off and turn the horse out to grass for a few weeks, or put it into a loose box and keep the floor soft with plenty of straw, or what is better, sawdust or short shavings.

Chronic Laminitis (Founder).—When a case of acute laminitis is not properly treated it becomes chronic. There is also chronic founder which really never has been acute. For instance, a horse has been badly shod for some time, and the pressure or weight of the body confined to the walls on account of the sole being cut away, there will be a little irritation set up in the sensitive laminae and coronary band, causing a little derangement, but not enough to produce lameness, but by degrees these parts become affected to such an extent as to cause a stiffness in moving, or even lameness.

Symptoms of chronic founder: The horse stands with its fore feet a little advanced and the hind legs brought a little forward under the belly. The position in standing will depend on the case. If the animal is suffering much pain the feet will be brought further forward. When the animal is brought out of the stable it will be stiff and step short and dig its toes into the ground, and in bad cases may go for some distance stumbling and its back a little arched. After moving awhile it seems to get better, steps out, and does not stumble, and the back is not arched; but the horse so affected always steps short, and horsemen thought it was tied up in the muscles of the shoulder and chest (chest founder), but such is not the case. The feet are the location of the trouble. The muscles of the chest seem to be wasted and in some cases they are, but the position in which a horse affected with chronic founder stands gives it that appearance. By degrees the feet shrink from wasting of the sensitive substances from the chronic form of inflammation of the feet. This form of founder cannot be cured, but can be helped by poulticing and blistering the coronets and continuing it for several months. Horses affected by chronic founder should be kept on the farm and off the hard roads.

Coronitis (Inflammation of the Coronary Substance).—This derangement usually affects draft horses used for pulling heavy loads and being shod with calkins on the shoes. It is also seen in horses of any breed and is caused by too much weight

being placed on the wall of the hoof, pressing upward on the coronary band, irritating it, and in some cases causing inflammation and lameness. I have seen a horse sent to be shod, and by the smith cutting or paring away the sole so that it was too thin to support the wall, the next day, after a drive, the horse would go lame.

Symptoms: Hardness and brittleness of the hoof, loss of toughness and pliability, heat around the coronet and upper part of the hoof, fullness and tenderness of the coronary band; if pressed upon the animal will evince pain. If both fore feet are affected the horse will have a shuffling gait, and the heels are put on the ground first. If only one foot is affected the animal will be lame. In some cases there will be a separation between the band and the hoof. The duration of this form of lameness depends on the severity of the case. It can be distinguished from laminitis by a bulging of the coronary band and the heat and tenderness of the part.

Treatment: Remove the shoe and poultice the foot for a few days, then put on a bar shoe, so that the weight will rest on the frog. Keep on a shoe of this kind until the sole becomes thick and strong, then put on a flat shoe, and keep the blacksmith's knife away from the sole. If lameness should persist after being poulticed for a week and a bar shoe put on, blister the coronet with cantharides two drams, lard one ounce. Repeat in two weeks if necessary. This is a very common form of lameness, and in the majority of

cases can be prevented by the proper method of shoeing mentioned in the first chapter on diseases of the foot.

Carbuncle of the Coronary Band.—This consists of an oval, irregular swelling on some portion of the coronary band. It is hard at first and sometimes very painful, causing lameness. After a time suppuration takes place at several points, which discharges unhealthy matter. In some cases it will spread all around the coronary, and there will be a number of small openings, from which thin matter will exude, forming a very unhealthy looking sore. Prof. Williams, of Edinburgh, says: "I am inclined to think it is due to a blood poison similar to that of glanders and farcy, as it is oftenest seen in unhealthy situations, ill-ventilated stables, and in horses with bad or gross constitutions. I was inclined, when I first saw it, to attribute it to some injury to the part, and to believe that the unhealthy action was the consequence of such an injury, or to the introduction of some deleterious material into the wound; but further experience has convinced me that it often originates from constitutional causes, and that it is an inflammation of the coronary substance, due to the presence of some morbid material in the blood." I am inclined to believe that the opinion of Prof. Williams is correct, as it is a very difficult derangement to cure.

Treatment: Poultice for a few days at first to assist it to form matter, then apply a lotion of acetate of lead half an ounce, sulphate of zinc half

an ounce, carbolic acid half an ounce, water one quart; bathe the sores with a little of this several times a day to reduce the swelling and if possible to dry up the part. If there is a discharge from little openings, probe them to find the direction and depth, then roll up one grain of bichloride of mercury in a piece of tissue paper and press it into the opening. If there are a number of these treat them alike. In a few days there will be a slough of the unhealthy part and it may then heal. If it does not use the mercury again, and so on until it becomes healthy; then use the above lotion. When it heals, if it should leave the band thick, blister it with cantharides blister as in founder. Give the animal a dose of aloes, to be followed by giving sulphate of iron four ounces, nitrate of potassium four ounces, nux vomica two ounces; mix and divide into twenty-four doses, to be given twice daily in bran mash.

False Quarter.—This is due to a deranged condition of the coronary band. The horny wall being secreted by the coronary band, it follows that if a part of it is destroyed, that the part of the wall below it can be no longer supplied with horn. The sensitive laminae supplies in a modified condition a substance to take the place of the horn, but it is usually thin and weak, and has fissures or cracks in it. These cracks are usually wider at the bottom than at the top. This derangement does not always cause lameness, but is very liable to do so, and therefore the horse may be considered unsound.

Causes: Injuries to the coronary band, destroying its secreting substance.

Treatment: If the animal is lame poultice the foot to reduce the inflammation; then put on a bar shoe, so that it will rest on the frog and wall, except the affected part; this will take off the pressure, and the animal will not go lame. Remove all the ragged edges, and cut a little of the band, then heal this as an ordinary wound, and there is a possibility of the band growing up and being capable of growing out a healthy hoof. I have succeeded in some cases. Keep using the bar shoe until the hoof grows down, and if it does not do so it will still be necessary to keep on the bar shoe to protect the weak part.

Sand Crack.—A sand crack may be found in any part of the wall of the foot. It differs from false quarter in being caused by a dry, brittle condition of the hoof. The parts where it is usually found are in front and on the inside quarters, seldom on the outside.

Causes: When the hoof from some cause becomes brittle, dry and hard it loses what elasticity it had and is liable to crack from over-exertion, so that a sand-crack may appear suddenly. This is the case when the sole of the foot is weakened by paring; the weight-bearing surface is limited to the wall, the weight thus thrown on the wall overstrains it, and it may split at once, or it induces a deranged condition of the structures to which it is attached, causing the dryness favorable for it cracking. Sand-crack begins at the top of

the hoof, where it is thin, and extends downward. It will gap a little when the foot comes in contact with the ground, and close again when the foot is elevated; on this account sometimes the sensitive tissue gets into the crack and gets squeezed, causing blood to issue from the crack. In this case the animal suffers great pain, and often inflammation sets in, and matter may form as a result.

Treatment: Poultice the foot for a few days to remove any inflammation that may be present and to soften the hoof; then put on a bar shoe so that it will not rest on the wall where the crack is, and take a sharp drawing knife and pare out a piece of the hoof at the top, separating it completely from the coronary band, about three-fourths of an inch on each side of the crack, down to the quick. This part can be filled with tar to keep out the dirt. A cantharides blister should be rubbed around the coronary band every third week. When the pressure of the old hoof is removed by this cutting the new one grows out sound, having nothing to interfere with it; but if this is not done properly as soon as a little of the new hoof grows out it splits as at first. I have made some good cures and kept the horse at work by the use of the bar shoe, and an occasional poultice at night if there was any fever in the foot. Clasps and nails put through the edges of the crack are of no practical value and should not be used. Sand-crack can nearly always be prevented by proper shoeing and keeping the feet cool. If

they should become fevered after a long journey on a hard road put them in a bran poultice for a few days, and if a horse has thin, weak feet, use the bar shoe during the summer, and do not touch the sole with the knife.

Keraloma.—This is the name given to a horny tumor caused by the toe-clip of the shoe, where it has been hammered too tightly, or from the animal striking its toe against the ground. This disease is usually found in the hind feet, although I have seen it in the fore feet. I have seen cases of this kind in which the horse was not lame; but unless the horse is properly shod and the part protected lameness will be the result. Poultice the foot to soften it, then cut away as much of the hoof surrounding the tumor as possible, so that there will be a groove between it and the wall; remove as much of the tumor as is prudent, then fill up the groove with tar and put on a broad shoe, with a piece turned up over the part to protect it. It has been recommended to remove the whole of the crust immediately over the diseased part by cutting through it on either side from top to bottom, detaching it from the sole and tearing it away, leaving the sensitive parts exposed. The operation is a very cruel one and should never be performed unless the disease has resisted all other treatment; even then it does not always succeed, as there is every likelihood of matter forming and destroying the sensitive laminae, preventing the development of a new horn. In some cases it succeeds, but it

takes months of treatment. I do not consider such treatment advisable.

Seedy-Toe.—This consists of a separation of the wall at the toe from the sensitive laminae, causing a hollow space, which emits a hollow sound when tapped with the hammer. It is the result of toe-clips. Especially is this the case when the shoe is put on hot and burned in, which should never be done. It is caused by laminitis and nails penetrating the hoof at the toe. This disease may be found sometimes at the side of the foot from the use of side-clips.

Symptoms: The hoof at the toe or side becomes very dry, and if pared has a cheesy or rather a mealy appearance, and a little exploration will show a separation of the sole from the wall. There will be a hollow space between the hoof and the sensitive laminae, which in some cases may extend to the coronet, and in some cases of long standing the hoof will bulge. It is not often that this causes lameness; but sand and other dirt are very apt to get in at the separated part and cause irritation, with fever in the foot, and lameness.

Treatment: This is a very troublesome case to treat. It seems to be almost impossible to get a union of the wall and sole. It has been recommended to remove all the loose hoof as far back as the quick, and treat it by applying tar and bandages and encourage the growth of horn. I have seen this tried, but it did not prove successful. The best treatment is to shoe the horse with a broad

toe-clip and fill well in between the clip and the separation with tar and oakum. This will prevent the dirt from getting into it. Keep the foot soft by putting on a poultice occasionally and by applying a cantharides blister to the coronet. In this way we will increase the growth of horn and in some cases effect a cure.

Corns.—Corns are the result of bruises at the angle of the heel between the bar and the wall, and usually on the inside heel of the foot, and always on the fore feet, as they are the weight-bearers of the body. The structure affected is the sensitive sole. The bruises cause a rupture of the small blood vessels, the blood extravasating into horny sole, causing a red spot.

Causes: Bad shoeing. Prof. Williams, of Edinburgh, says: "The ordinary seated shoe is the most irrational invention that ever emanated from man's brain. It is a thing that bears upon no part of the sole except upon the spot that is incapable of bearing such pressure. It is dished out, made concave all around the foot except at the heels, and the result is corns." This saying is correct. Corns can be produced only by pressure on the part, and the above described shoe is calculated to do it. A shoeing smith should be ashamed to shoe a horse in this manner in this enlightened age; still that is what they are doing every day. It is said by some of those men that they have found corns on horses that never were shod. Such a case may happen in the unshod horse by the inner corner of the hoof growing long and inclined

to turn inward and then press on the sensitive part, causing a corn, but such cases are very seldom seen, and are no excuse for bad shoeing. To prevent corns leave the sole untouched, rasp the wall level, and put on a flat shoe, so that the pressure will be even all around, the sole bearing part of the weight, and you will never have a corn on your horse's foot.

Symptoms of corns: The horse will show more or less lameness. When it stands it will put its foot out before it, resting on the toe. If both feet are affected it will shift, pointing first one, then the other. In examining the foot to find the cause of lameness there will be heat on the inside of the hoof at the heel, and if tapped lightly with the hammer the animal will flinch. Remove the shoe and take a pair of pincers and press with them all around the sole, and when you come to the heel the animal will evince pain on slight pressure. Take a knife and pare a little off the sole at the angle of the bar, where you will find the sole red. In some cases of corns there will be first inflammation, terminating in the formation of matter, or a shrinking of the sensitive laminae. Often the matter finds its way out of the top of the hoof. When there is matter forming there is usually great lameness. The result of long-continued corns is contraction of the heel. Corns are the most common cause of contraction.

Treatment: Remove the shoe and poultice the feet to soften the hoof and relieve the inflammation. Then rasp the wall of the hoof level and put

on a level bar shoe. When the shoe is fitted rasp away a little of the wall at the seat of the corn, so that the shoe will not press on it. By thus removing the inflammation by the poultice, and the bar shoe taking the weight off the sore part, the animal will go sound. The corn should never be pared, and no strong medicine, such as spirits of salt, applied to it, as it does harm and is unnecessary. In some cases by removing the shoe, which is causing the corn, and putting on a bar shoe, removing the pressure from the part, the horse will go sound without having to be laid off work. If matter forms it will be necessary to make a small opening to allow the matter to escape, then put on a poultice for a few days, then put on a bar shoe as above. Put a little tar and oakum in the opening to keep out the dirt until a new piece of sole grows up. The bar shoe should be used until the sole of the foot grows strong. Then by using the flat shoe and not paring the sole you will not be troubled with any more corns on your horse's feet. Thousands of dollars are lost yearly from corns alone caused by bad shoeing.

Thrush.—This is a disease characterized by a foetid discharge from the frog, caused by a diseased condition of the secretory surface of the fatty frog. The clefts are the parts usually affected, and if the disease is not properly treated it will soon spread over the whole frog, causing a detachment of the horny part from the sensitive.

Causes: Anything that interferes with the health of the part, notably bad shoeing, by pre-

venting the frog from coming in contact with the ground. It is also caused by the animal standing in dirty stables, and some years when the barn-yard is in a wet, muddy condition for a long time the feet never getting a chance to dry, but I have found more cases caused by the former than the latter.

Symptoms: There is a discharge of a very foul smelling matter of a dark color exuding from the clefts of the frog. In cleaning out the clefts they will be found deep and extending into the sensitive parts, sometimes causing lameness. As it spreads the horny frog becomes detached and there will be matter underneath it. In cases where it is caused from navicular disease it is incurable.

Treatment: Clean out the parts well, and if the horse is lame put on a poultice of linseed meal for a few days, then dry it and press a little calomel into all the cavities; then press in some paper or soft rags to keep in the calomel and keep out the dirt. Clean out every second day until the clefts are dry and healthy. Remove the cause to prevent a return of the disease.

Canker.—When a structure composed of low organized tissue becomes injured, such as the frog, it is very apt to produce a rapid growth of unhealthy tissue, spreading over the whole of the frog, even sometimes extending to the sole, but is generally confined to the frog. As the fatty frog is a tissue of low organization it is the usual seat of canker. When tendons about the lower part of

the legs and bulbs of the heels are injured we find a growth resembling canker developing.

Causes: It is said by some to be caused by a vegetable parasite, but I do not think such is the case; the vegetable parasite is the result, not the cause. I have removed the horny frog and bound on the exudation from a canker, but could not produce it. It is said from some unknown reason horses with lymphatic temperaments, thick skin, flat feet, fleshy frogs, heavy hair, and particularly white feet and legs are especially liable to canker. The tissue of such horses is soft and low organized, and when injured is not so easily healed as that of a well-bred horse, and has more tendency to take on an unhealthy development. I think that is likely the reason why the heavy draft horse is more liable to such derangements. It is said the is likely the reason why the heavy draft horse is more liable to such derangements. It is said the condition most favorable for the development of canker is dampness; in fact, dampness seems to be indispensable to the existence and growth of the parasite. I have no doubt that such is the case so far as the parasite is concerned, but as for canker the majority of cases that have come under my notice have been horses which worked in the city, having good, comfortable, dry stables. I cannot recall a case which I consider was caused by dampness. The worst case of canker I ever had to treat was during the summer months, when everything was excessively dry and the stable was kept clean. Canker seems to be a disease peculiar

to some horses, as it sometimes affects two or three feet of the same horse at the same time, and I think is caused by bad shoeing, that is, cutting away too much of the horny frog, and when the animal tramps on some hard substance the fatty frog is bruised, this being the exciting cause. It is also the result of nails penetrating the frog, or other injuries.

Symptoms of canker: There is an abundant discharge of a thin, very offensive smelling fluid. The frog swells, becomes soft and spongy. The outer surface may have some stringy fibers of horn, which, if it is pared off, bleeds very freely; in fact it has become a bleeding fungus. In some cases the discharge dries, forming cheesy patches composed of horny cells, very foul smelling. Although healing preparations have been used, it has no disposition to heal, but gradually gets worse and the animal becomes very lame. If only one foot is affected it will hold it up for a while; if two or more feet are affected the animal will lie down the greater part of the time, and it may require assistance to rise.

Treatment: If the animal is fat give it a dose of aloes as a physic. Follow this by giving one teaspoonful of phosphate of calcium in the morning and a heaping teaspoonful of sulphate of iron in the evening. Continue this for two weeks. If the animal is fevered give half an ounce nitrate of potassium a day in a bran mash. Poultice the foot for a few days with linseed meal made into a poultice with boiling water and spread it on a cloth,

and when cool enough to apply sprinkle on a teaspoonful of acetate of lead. Remove it twice daily. After the surrounding horn is softened and the foot cleaned by the poultice, then remove all loose horn, and also pare the frog down to the quick, and after bleeding has ceased clean and dry the part well. Take a piece of smooth stick and rub on a little finely powdered bichloride of mercury; use no more at once than would lie on a dime, as there is danger of it becoming absorbed, but no danger from using that quantity. Cover the part with dry cotton batting or oakum and put on a boot or bag. Do not disturb this until the end of the second day, and if it is still dry and the surface hard, let it alone for another day or two. When the crust that has formed by the mercury comes off, apply a little more, and so on until it appears firm and healthy. This is the best thing to use in the majority of cases, but when the discharge keeps up, which it will sometimes do, use a liquid caustic, such as terchloride of antimony or diluted nitric acid. Put on sufficient to cover all the diseased surface. Protect the sore as before, and repeat the caustic once a day if necessary. If there is any hard horn pressing on the sore part remove it. A shoe should be put on, as it will protect the sore. After the unhealthy parts have been removed I find that to sprinkle calomel over the surface once every third day is a good thing. Some prefer tar, with a little sulphuric acid, two parts of tar and one of acid. Dip cotton batting or oakum into it and spread over the surface, and keep in place by

putting strips of tin between it and the shoe. Whatever medicine is used, it takes a long time to cure it, but most cases can be remedied if the treatment is continued and well done.

Punctures to the Sole of the Feet by Nails.—A horse may step on a nail and it may pierce any part of the sole, but usually it is found to have entered the cleft of the frog. The danger of a nail penetrating the foot is the depth it penetrates and the structures it injures. Thus a nail enters the cleft of the frog midway between the toe and the heel, and if it should penetrate deep it would likely wound the coffin joint, causing a severe lameness, and sometimes the death of the animal. I have seen several cases of this kind.

Treatment: Remove the nail as soon as possible. Clean the foot and put on a bran poultice to assist in keeping down the inflammation, and continue this for three days. Pare away a little of the sole, as it is likely matter will form. This being done pour on a little diluted carbolic acid, a teaspoonful to four ounces of water; dress it once a day and keep it clean by putting on a dry bag. The horse should not be put to work until it is over its lameness. The sole is sometimes punctured by some sharp substance. If the animal is lame the shoe should be removed and the sole cleaned and pared out a little and the puncture found. Pare away a little of the sole at the puncture, just sufficient to allow the matter to escape. By cutting out a piece of the sole the sensitive sole will protrude and often become fungus. There is no need

to remove more than will let the matter out. Put on a poultice to reduce the fever, then treat as for nail in the foot.

Pricks in Shoeing.—In driving the nail in shoeing it may penetrate the sensitive sole, or it may be so close to it as to cause a pressure on the sensitive part. When a horse is pricked in shoeing the animal will jerk his foot away from the smith, the nail is drawn out, but the sensitive sole is wounded. The animal may go lame or it may not. When the nail is too closely driven to the quick, causing a slight bulge of the horny part against the sensitive, there may be no lameness when the horse leaves the shop, but in a day or two the animal becomes lame. In all cases in which a horse becomes lame, at or soon after being shod, and if no other cause is apparent, it will be necessary to have the shoe removed and the foot put into a poultice for a few days to remove the soreness. In cases of pricks it may be necessary, if the animal remains lame after the foot has been poulticed, to pare the part where the nail punctured to allow any matter that may have formed to escape. Replace the poultice again for a few days. By attending to this properly you may save the animal much suffering and yourself much loss, as I have seen several cases of lock-jaw caused by pricks by the nail in shoeing, which, if they had been attended to at once, could have been saved. It will be necessary to put on a bar shoe in order to remove weight from the injured part and have it rest on the frog and sound part of the foot.

Weak Feet.—There are some horses whose feet are naturally weak, having thin heels, and very brittle walls, that will split into layers when the nails are driven. Such feet require to be shod with strong bar shoes; and in some cases it will be a benefit to put leather soles under the shoe. Any horse which shows any tenderness or slight pain after a long drive or a hard day's work can be greatly relieved by having the feet and legs bathed in water; or better, a bran poultice put on during the night. This will remove the soreness, and the animal will be sound in the morning.

Quittor.—This is the name given to a fistulous opening upon the heels and quarters of the coronary band, and is caused by treads, pricks in shoeing, bruises, and suppurating corns. Any injury which will cause suppuration within the foot will usually cause matter to form at the coronet, and may result in quittor.

The symptoms of quittor: Swelling upon the coronet, great lameness, and a discharge of thin or thick curdy pus. There may be one or a number of small openings leading down into the sensitive part of the foot. The parts surrounding the quittor swell and become hard and take on a peculiar unhealthy action and are difficult to cure.

Treatment: Clean the foot and put into a bran poultice for several days, then remove any horn that may be pressing on the sore part. If it is at the heel remove the crust with the knife; if it is in front rasp it thin. If it is caused by a puncture in the foot open up the part a little so that

if there is any matter it will escape. Then probe the opening at the top to find the depth and direction. Take a grain of the bichloride of mercury and roll it up in tissue paper into a cone and press it down to the bottom. Serve all the openings in this way. Put the foot into a bag to protect it from injury and let it alone for three days, then clean out the openings and put in some more of the bichloride of mercury, and so on for two weeks, or until the parts become healthy and the hard swelling has decreased; then make up a bath of chloride of zinc one ounce, water one gallon; put the foot in this twice a day for twenty minutes at a time. As soon as the openings are healed blister the coronet with cantharides two drams, lard one ounce; repeat in two weeks if necessary. When it is time to put on the shoe and work the horse, a bar shoe will be best. If the animal has much fever in the early stages of the disease give a dose of aloes, and follow this by giving half an ounce of nitrate of potassium twice a day in mash. Later in the disease give a teaspoonful of sulphate of iron once daily in bran mash as a tonic.

SORE FEET IN CATTLE.

Cattle are occasionally affected with sore feet, by hard substances getting impacted between the hoofs. This happens often in towns and where the cinders from coal fires have been put in the yard, this substance getting in between the claws into the soft parts, causing inflammation, suppuration and great lameness. The cinders should never

be put into yards where cloven-footed animals are kept. Cattle kept standing on a hard floor, or sometimes on very hard pastures, or driven on hard roads, are liable to suffer from sore feet, resembling founder in horses. Nails and other sharp bodies sometimes penetrate the feet of cattle.

Symptoms: The animal is seen to go lame, or a sore swelling may appear at the back of the foot or heels. It will be necessary to examine the foot or feet carefully and find the cause. If it is from impaction of hard material in the cleft of the hoof have it removed and the parts well cleaned, and use a lotion of zinc chloride one dram, water one pint; dress with this twice a day and keep the animal on clean straw until healed. If from some sharp substance in the hoof remove it and pare a little opening in the sole and use a little of the above lotion. It is almost impossible to keep a poultice on the feet of cattle, especially on a hind foot, as it will keep kicking until the poultice comes off. If it is caused by standing on a hard floor or hard ground remove to a damp, soft place for a few days, when usually the animal will be relieved. The disease known as the foot and mouth disease, or foul in the feet, which is a contagious one, has not reached this country. There have been some few cases which somewhat resembled it, but on investigation it proved to be only a local disease and not contagious. I have met with some few cases in which inflammation had taken place in the sensitive sole, causing a separation of the horn from the soft parts; also granulations

of a soft, unhealthy substance at the heel between the claws. This was called "foul in the foot," and a few cattle on the same farm were affected with it. I found that it was not contagious and readily yielded to treatment. Clean the hoofs and remove some of the loose horn, and remove any matter that is lodged between the horn and soft parts and dress it with the above lotion. If there are any unhealthy granulations apply a little terchloride of antimony with a brush or a feather once a day until they are reduced, then apply the chloride of zinc lotion to heal the part. The animal should be kept in a clean place while under treatment.

CHAPTER XXI.

FISTULA OF THE WITHERS.

This is a disease usually found on the withers, but may occur in other parts of the body. It is caused by a bruise, pressure, or injury. Sometimes it may be caused by the collar or saddle and is also caused by horses rolling on something hard. Horses with high withers are usually more prone to it. I have also taken notice in my practice that two-thirds of the cases I have treated were mares, I think from their withers being bitten by the horse. The deep parts are affected by a low form of inflammation, causing some swelling; and by degrees the injured tissue breaks down into matter, and if the part is not opened will break of its own accord and discharge. There is a tendency of this part to form a quantity of false, unhealthy tissue of a soft, spongy texture, and as long as any of it remains the part will not heal, and if it should do so it will soon break out again, and in the meantime more false tissue will form. It is said that the matter burrows down through the muscles. This is not correct, as I have never seen a case in which matter burrowed, unless between the skin and the flesh, and not often there. If such was the case, in old standing fistulas the matter would find its way out at the bottom instead of the top. The

matter forms by the breaking down of the tissue in the direction in which it is injured. The idea that it is necessary to have a depending opening for the escape of the matter is a mistake. I have proved to my own satisfaction that healthy pus does not prevent a wound in any part of the body from healing. Fistula is considered a very troublesome disease to treat; but since I have adopted a method first introduced by my late brother, Dr. James McIntosh, I have had no difficulty in curing it. I have treated fifty-four cases of it at the free clinic at the University of Illinois and all were cured. A number of these were of two and three years' standing and had been treated in the old way by the use of the knife. After experimenting for several years on this disease by the use of the knife and various caustic medicines, my brother adopted the following treatment: Examine the opening with a probe to find the direction and depth, and at the same time ascertain if there is any foreign substance in it, such as a fragment of bone from the spine of the vertebra or disease of same. When satisfied that there is none (or if there should be remove it), then take a strip of soft muslin and dip it in terchloride of antimony and press it into the opening, then draw it out again and put in another. Let the last remain in for some hours; then draw it out, let it alone for three days, then repeat. If there is more than one opening serve the others in the same way. On the third or fourth day repeat, and so on for three or four weeks until all the unhealthy tissue is destroyed,

which is known by the mouth of the opening sinking in and the swelling being reduced. Besides putting the antimony into the openings it is necessary to rub a little of the following on the swelling: Cantharides, two drams; lard, one ounce; rub on a sufficient quantity of this well in with the fingers. Repeat in two weeks. This form of blister seems to have the power of acting as an alterative, changing the unhealthy tissue into healthy, and therefore assists greatly in the cure of fistula. In a week or two after stopping the use of the antimony, if the openings should show signs of bulging, and have a bluish, spongy aspect, use the antimony again for a few times, as it is possible that all the pipes were not destroyed. I have had to do this three or four times before I succeeded in getting it in a healthy condition to heal. Keep at it even if it takes several months to cure it. There are cases in which the withers of the horse get bruised, causing swelling and heat of the part, which would likely become a fistula if it were not properly treated. Bathe the part well with cold water for twenty minutes three times a day, and apply acetate of lead, half an ounce; water, one quart. Saturate a piece of woolen rag with a little of this and lay it over the swollen part after each bathing, until the heat is removed, then use the cantharides blister above mentioned. Repeat every second week. This will either scatter it or hasten the formation of matter. If a part of the swelling becomes very soft and the hair drops out it is in a condition to be opened with the knife. After removing the

matter by injecting water into it, use the antimony as above directed.

POLL-EVIL.

This form of fistula is situated on the "poll" behind the ears, and is caused by injuries and using a tight bearing rein.

Symptoms: A swelling appears behind the ears, it may be on one side or both. When it appears quickly it is hot and painful to the touch; at other times it comes on gradually and is not hot or tender. It increases very slowly and it may be years before it turns into a fistula. I have seen a number of cases of this kind, and all enlargements behind the ears should be looked upon with suspicion. In some cases matter will form in a few days.

Treatment: In all cases of swelling in this locality the treatment should be energetic and well done; a fistula when established is very difficult to cure, as there are so many tendons in this part that it is not easy to get under them, and the tissue is of the low order, having a great tendency to develop quantities of unhealthy flesh. In the early stage before matter has formed, and it is hot and tender, bathe it for half an hour with cold water three times a day and apply the lead lotion as for the fistula of the withers. After all the heat has disappeared and the swelling remains, apply the cantharides blister; and for those lumps which are developing slowly and which have no heat or tenderness in them, also blister every second week and continue it if necessary for several months,

and in the majority of cases they will disappear. The bearing rein should not be used on a horse so afflicted; in fact, it should not be used on any. It is cruel to keep a horse for hours with its head elevated in the air, and if the poor brute is driven facing the sun it suffers greatly and it destroys the sight to a certain extent. I hope the day is not far distant when no right minded man will allow a bearing rein on his horse. When the matter forms, the lumps ought to be opened and the parts cleaned out with water and the same manner of treatment used as for fistula of the withers. Sometimes stiffness of the neck is the result of poll-evil, and may in some cases be benefited by repeated blistering with cantharides.

FISTULA.

A fistula may form in any part of the body, and is the result of an injury caused by the lodgment of some foreign substance such as a piece of wood or a nail in the muscle or the bone, and the tissue may become diseased, which causes the formation of matter, keeping up the discharge. A horse was brought to me which had a discharge of matter from a small opening in its hip for over two years. On examining it with the probe I found at the depth of four inches a hard substance. I had the horse cast and I cut down on this hard substance and found it to be a piece of wood imbedded in the muscle, surrounded by a tough membrane with a small opening in it through which the matter that accumulated passed out to the surface, forming a

fistula. The wood was removed and it healed in a few weeks with very little treatment. A little of the following, acetate of lead half an ounce, sulphate of zinc half an ounce, water one quart, was injected once daily. I give this as an illustration, and I have seen many cases resembling it. If a deep sore does not heal in a reasonable time, it should be examined with a probe to find the cause and remove it if possible. If nothing can be detected in the wound, treat as recommended for fistula of the withers.

CHAPTER XXII.

WOUNDS.

In the study of wounds it is necessary to understand the nature of the structure wounded. The external surface of the animal body is chiefly composed of two kinds of tissue, the highly organized and the low form. All the fleshy or muscular parts belong to the former; the tendons, ligaments and cartilage to the latter. What is meant by highly-organized tissue is where it is largely supplied with blood vessels, nerves and lymphatics, while the low order of tissue contains very few if any blood vessels, nerves and lymphatics, and is nourished by the vessels which ramify over their surface. When a muscle is wounded, the first thing nature does is to pour out a liquid to repair the mischief done. This may take place by adhesion or by a fine granular substance which develops and fills up the injured part; blood vessels shoot into it and it becomes flesh, and so it proceeds until the part is repaired, and if no accident happens to it, either by the animal rubbing or biting it, and last but not least, by the applying of irritant substances such as turpentines or strong liniments, which destroy the fine, delicate young tissue that nature is pouring out for repair, all that is needed to assist nature in the healing is to pro-

tect it from injury if possible. First examine the wound to find the depth and direction and to see that there is no foreign substance in it, then remove all hair or dirt and wash it out carefully with water in which a little carbolic acid has been put, about a teaspoonful to the quart of water. If it is a superficial wound it is best cleaned by letting the water run over it, and if deep, use a syringe with gentle force. Washing with a sponge is too rough for the new tissue. If the wound is a clean cut, lengthwise on the muscle, stitching is of use. If the wound is ragged or cut crosswise, stitching is of no use, as the ragged parts have to slough off and the movement of the muscle prevents a cut from uniting and must heal by granulation. After a wounded muscle has been cleaned, wash as little as possible, as it will disturb the healing process. In the majority of flesh wounds, if they are not disturbed they will heal very rapidly. They will heal even if treated by strong liniments, but very likely there will be a blemish, which would not be if nature was not interfered with. There is an idea that most people have that they must use something to keep out the cold or heat, which is a mistake, and by doing this the strong medicines used do far more damage than the cold or heat.

Wounds are divided into four kinds: Incised (clean cut), lacerated (torn), contused (bruised), and punctured wounds. I shall give the treatment of each kind separately. A clean-cut wound lengthwise on the muscle usually heals by what is called first intention. First examine the wound as to its

depth and direction and to see that there is no foreign substance in it, next stop bleeding by applying cold or hot water to it. If a large vessel has been cut, it requires to be tied. Then mix one teaspoonful of carbolic acid in a quart of water and let a little of this run over the cut surface. Then bring the edges of the wound together either by pins, silk thread, or cat-gut steeped in the above lotion. Pins are the best, as they remain in longer without sloughing. The pin should be inserted one-eighth of an inch from the edge, and when both lips have been transfixed in this way, a thread or small cord carried around both edges of the pin and made to describe a figure eight will hold the wound close. The pins should be put in about three-quarters of an inch apart. If the thread or cat-gut is used the needle should be passed in about a quarter of an inch from the edge of the wound and brought out at the other side about the same distance, then the two ends of the thread are tied and another stitch about three-quarters of an inch apart, and so on until the wound is closed; apply a little carbolic lotion once a day to the part, but be careful not to disturb the wound. If the wound is across the muscle and is of an inch or more in depth, stitching is of no benefit, as we cannot prevent the cut ends from moving below the stitches and union will not take place, but if it is superficial it may be stitched as before described. If the part should swell and get hot it will be necessary to take out some of the pins or stitches in order to get it cleaned. Foment with hot water or

cold water. Then inject some of the carbolic lotion; do this several times daily. After the inflammation has been subdued the wound will heal by granulation.

Lacerated (torn) wounds require to be examined as the others, cold or hot water used to stop bleeding, and cleaned by letting water run over them. There is no benefit to be derived from sewing up a wound of this kind, as the ragged parts have to slough off in the form of matter, and if it is penned up by the wound being stitched it cannot escape; the parts swell, and the stitches give way, leaving the edges more ragged than before, so it is best in all cases of torn wounds not to stitch them. If after a time the wound should assume an unhealthy or spongy appearance, use acetate of lead, half an ounce; sulphate of zinc, half an ounce; acid carbolic, one dram, and water, one quart. Clean the wound with water, then apply a little of this lotion twice a day.

Punctured wounds are the most dangerous of all because they are liable to contain foreign substances, such as hair, pieces of wood, etc., and are likely to inflame, ending in mortification and perhaps the death of the animal. Wounds of this kind require to be examined with great care. Probe the part to find the depth and direction of the wound, also to ascertain if there is any foreign substance at the bottom of it, and if so, it must be removed. It is advisable to make the opening larger, also to have it depending, so that any fluid or matter that may form in it will run out. It is

often very difficult and even dangerous to do this, besides causing extra suffering to the animal. And I find that a depending opening in the majority of cases is unnecessary if the wound is properly treated. Instead of enlarging the wound, clean it as well as possible, then dip a piece of soft muslin in a solution of carbolic acid, three drams; water, four ounces; press this down to the bottom of the wound with a probe, let it remain in for a few hours, then draw it out and put in a fresh one; do this three times a day for a few days. This will act as an antiseptic, destroying germ life and preventing mortification. In a few days matter will form and all danger is passed. Clean it out twice a day with warm water and inject a little of the carbolic lotion used for incised wounds.

Contused Wounds.—These are usually caused by pressure, kicks or bruises. In the majority of cases the skin is not broken, and if the part is bathed with acetate of lead, half an ounce; water, one quart, several times a day to keep down inflammation it will likely give no trouble, but sometimes effusion will collect from the effects of the injury, and the part will swell up and will be soft and puffy to the touch. In this case it will be necessary to open it and allow the fluid to escape. Then inject a little of the following twice a day: Zinc chloride, two drams; water, one quart. If it leaves a thickening, rub on biniodide of mercury, one dram; lard, one and a half ounces, every second week. For old, unhealthy sores, such as are made by a constant rubbing and will not heal, remove

the cause and apply a little terchloride of antimony with a feather. In three days a scab will come off, and if it looks soft and spongy apply a little more of the antimony every third day until the part becomes healthy. Then use zinc oxide, one ounce; lard, two ounces; rub on a little once daily.

We now come to speak of wounds of the low order of tissue, which is found in the legs from a little above the knees and hock joints to the feet; here we have the tendons, ligaments, cartilage and their connective tissue covered by skin. These structures when injured require great care so that they will heal without leaving a lump or blemish. Usually a low form of inflammation sets in and we have a discharge of a yellow sticky substance which exudes from the wounded tendon, also secretions from the connective tissue. The surrounding parts swell and become hard. The center of the wound also fills up and in time becomes higher than the surrounding skin, and when the wound heals it leaves at this part what is called a bunch without any hair, which is a very unsightly blemish. On account of so many barb-wire fences nowadays there are a great many horses and colts blemished about the legs and feet. When an animal meets with an injury to any part of the leg from the knee downward, put it in a place where it can be kept quiet and prevent it from hurting the part. Bathe it every half hour for the first twenty-four hours with a lotion made with acetate of lead, half an ounce; sulphate of zinc, half an

ounce; tincture of arnica, two ounces; water, one quart. This will keep down inflammation and prevent the outpouring of the secretions above mentioned. After twenty-four hours bathe it well three times daily until it heals. If it should fill up higher than the skin, then apply a little bichloride of mercury with a smooth piece of stick. Never use more at a time than would lie on a dime, as there is danger, if large quantities are used, of enough becoming absorbed to poison the animal. Use it every third day until it is lower than the surrounding skin. Apply the healing lotion as before. By keeping the center lower than the surrounding parts the skin will grow over it, leaving no bunch or blemish. If there should be a thickening of the surrounding skin, which I have sometimes seen after it is healed, rub on a little of the following: Biniodide of mercury, two drams; lard, four ounces, mix. Let it remain on twenty-four hours, then wash off and apply a little lard. Repeat every second week until the enlargement disappears. In any of the above named injuries, if the animal is fevered or its legs swell from standing, give the adult horse half an ounce of nitrate of potassium three times a day in its drinking water or a bran mash for a few days, and half this quantity for a yearling. If the animal is in an unthrifty condition give the following: Sulphate of iron, four ounces; nux vomica, two ounces; nitrate of potassium, four ounces; mix and divide into twenty-four doses, one to be given twice a day in mash, and half the quantity for a yearling colt.

CHAPTER XXIII.

DISEASES OF THE EYE.

Simple Ophthalmia (Conjunctivitis).—This is an inflammation of the superficial structures of the eye.

Causes: Colds, injuries, bites from insects, the lodgment of chaff or other foreign bodies, and from "pink-eye."

Symptoms: The eyelid will be closed or partially so from the swelling; there will be an increase in the secretion of tears, which will run down the cheeks, scalding them, and in a short time the hair will drop out where the tears pass over; the eyeball will be drawn back and the membrana nictitans (the haw) partially covering the eye. The lining membrane of the eyelids is red and swollen, and in bad cases it will protrude between the lids. In the course of a day or two if it is not attended to there will be a whitish scum form over the eye. If it is caused by an injury there will usually be found a mark or a depression on the ball. If from chaff or other substances it can be readily seen.

Treatment: Carefully examine the eye to find the cause; if it is a hay-seed or chaff or other body it must be removed. This is usually difficult, as the horse or ox will force the haw over the eye and thus prevent you from getting the foreign sub-

stance out; a twitch should be put on the horse's nose, or the finger and thumb on the ox's nose. This will attract their attention. Hay-seed and chaff are best removed by putting a piece of soft silk or muslin on the end of a probe or stick and gently pushing upwards and backwards, in this way removing it. If any substance should be sticking into the eye, it is best removed with the forceps. After the cause is removed bathe the eye with cold water for ten or fifteen minutes three times a day, then apply a little of the following after each bathing: Acetate of lead, ten grains; tincture of opium, ten drops; water, one and a half ounces; this is best put in with a feather; use a clean feather each time. The scum that forms over the cornea is not on the outside of it, but an effusion between the coats of the eye, caused by the inflammation, and usually when the inflammation is subdued it passes away. There is a practice which some have of blowing burned alum into the eye; this is worse than useless, as it will tend to keep up the inflammation, besides being very cruel to the animal. If it should remain after the inflammation is all reduced apply a little of the following once a day with a clean feather: Nitrate of silver, five grains; distilled water, one ounce; continue this for several weeks if needed, as absorption sometimes goes on very slowly in this case.

Periodic Ophthalmia (Moon-Blindness).—This is a very common disease of the eye in horses in some parts of the country, especially in what is termed the Mississippi valley. It is a constitutional dis-

ease, arising from some cause not well defined at present. Low, undrained lands seem to be at least one of the causes, as it disappears by degrees after the land has been drained and cultivated. It seems to have a tendency to run in some breeds of horses.

Symptoms: The attacks usually come on suddenly; a horse may be all right in the evening and by morning be badly affected either in one eye or in both. The eye shows signs of weakness, the upper lid droops and the eye seems smaller, it stands light badly, and when the animal is brought into the light the eye seems to retract and the haw is drawn over it and the lids closed as much as possible; there is an abundance of tears, which gives the eyes a very watery appearance. When the eye is examined closely it looks dull and muddy and it is impossible to see the deep structures. In some cases the eyeball has an amber color. The disease may move from one eye to the other, and usually disappears in a week or ten days, to return in a few weeks again. Its return is very regular in some horses, and in others it may not return for six months. The first attack seldom causes blindness, but each attack deranges the structure of the eye to a certain extent and by degrees the deep structures are destroyed, and the ball has a bluish white appearance.

Treatment: There is no cure for this disease, but by attending to it when it appears I think in a great many cases it can be helped; that is, we can subdue the inflammation and prevent destruction

of the eyesight. When the attack comes on, keep the animal in a moderately dark place and bathe the eyes with cold water for ten or fifteen minutes, and use acetate of lead, ten grains; tincture of opium, ten drops; water, one and a half ounces, to be applied after each bathing; this should be done three times a day, and give one dram iodide of potassium twice a day for four days in bran mash. If this is well done I find that the eye will be left as clear as before the attack, but it will not prevent it from returning; but if we can by this treatment prevent the animal from becoming blind we are accomplishing a great deal. I have tried arsenic and quinine as a preventive, but have not succeeded.

Glaucoma.—This is a disease of the vitreous humor, destroying its transparency and causing it to become of a blue color, and is often the result of ophthalmia cataract and amaurosis, and very often becomes calcareous instead of remaining in a fluid form. It sometimes appears in old animals without any previous inflammation. It is incurable and treatment would be of no use.

Amaurosis, or Glass Eye.—This is a diseased condition of the optic nerve, causing loss of power to receive or transmit impressions of objects to the great nerve centers of the brain.

Causes: Sudden shock by loss of blood, or I have seen it from an animal striking its head, or in falling backwards and its head coming in violent contact with the ground. It has been caused by too heavy pulling, or by being driven to exhaustion.

It is also associated with derangement of the nerves of the brain, and is said to be caused by various vegetable and animal poisons.

Symptoms: The eye looks glassy and is wider open than natural, the pupil is dilated and gives the animal a look of staring, the animal steps high and the ears are pricked up and it will run against objects in its way. Williams says: "To detect the paralyzed condition of the iris consequent upon the loss of power in the optic nerve, all that the practitioner has to do is to place the animal in a strong light. If the pupil remains round and large, although the eye presents no sign of organic change, amaurosis is present." In cattle it is sometimes caused by a deranged state of the brain from disease of the stomach, and is temporary in most cases of milk fever. In this case when the animal is cured it regains its sight. Amaurosis in most cases is incurable.

Punctures to the Eyeball.—This is an accident which is likely to happen to any animal, caused by it running its eye against something pointed, such as a nail sticking out on some of the boards of the manger, sharp ends of hay, straw or thorns.

Symptoms: The eye is kept closed and there is a copious flow of tears from it. On examination the puncture will be easily seen. If it is only into the cornea there will be an oozing of water, but if it is deeper, the vitreous humor may be leaking; if so, it resembles boiled starch with a purple tinge, and if the opening is large it may all run out; if it does so, there will be a shrinking of the eyeball,

as the vitreous humor will never be replaced. On the other hand, if the cornea is the part punctured, as soon as it heals it will fill up again. There will be considerable inflammation in the eyeball and surrounding structures and the animal will suffer much pain.

Treatment: Keep the animal in a dark place and bathe the eye several times a day with cold water; after each bathing put several thicknesses of muslin over the wounded eye; wet it often with a little of the following lotion: Acetate of lead, half an ounce; tincture of opium, one ounce; water, one quart. This plan of treatment will reduce the inflammation and assist in causing contraction of the opening. It is best not to put any medicine into the eye, as it is apt to remove any coagulated material that is formed in the puncture or around it, allowing more to escape. I usually keep up this treatment for a week, and by this time the inflammation will be reduced, and in favorable cases the opening will be closed, and if there is a scum over the eye or part of it, mix four grains of sulphate of zinc in one ounce of water and apply a little of this to it twice a day with a feather. If there is a little bunch at the puncture this should be touched gently once a day with a pencil of nitrate of silver until it is reduced as low as the edges of the opening, which will then likely close.

Ulcers on the Cornea.—Occasionally we will find a case in both horses and cattle where there will be ulcers on the cornea, usually at the juncture of the cornea and sclerotic. This is best treated by

touching them once daily with nitrate of silver. If the animal is in poor condition and not thrifty give sulphate of iron, four ounces; nitrate of potassium, four ounces; nux vomica, two ounces. Divide into twenty-four doses, one to be given once daily. Also boil a teacupful of flaxseed into a pulp in two gallons of water, and while hot pour it into half a pail of bran and make a mash of it, and when cool put one of the powders into it; continue this until the powders are all used; repeat if necessary.

Filaria Papillosa (Worm in the Eye).—"Worm in the Eye" is sometimes seen in the eye of the horse. I have seen only one case of it. In this it was called "snake in eye." The worm is usually from one and a half inches to two inches in length, very delicate and of a white color. Its place of abode is in the aqueous humor of the eye, and can be easily seen floating in it, and sometimes its movements are very lively. The same kind of worm has been found in other cavities of the body and it is likely taken into the system by the water or food. It is said that it usually causes inflammation, but in my case it did not seem to produce any, as the eye was clear and healthy. Its removal is accomplished by making an incision with a lancet in the upper and outer margin of the cornea, and the worm will escape with the water. Bathe the eye with cold water for a few days and keep the animal in a dark place.

Entropium (Inversion of the Eyelids).—In this case the free margins of the eyelid and the eye-

lashes are turned in against the eyeball, keeping up a constant irritation, which is painful to the eye, causing great distress and inflammation to the superficial structures. It is usually in the foal that it is seen, but it may happen at any time of life from paralysis of the muscles of the eyelids. The only cases that have come under my notice have been congenital.

Treatment: Elevate the eyelid and take note how much loose skin there is, and the size necessary to remove to keep the eyelashes in their proper place, then fold the skin so that when it is cut it will be of an elliptical shape; then bring the edges of the skin together by putting small pins through them and tying thread around the pins in the form of the figure eight (two pins are enough); let them remain in until it heals. I have operated on two cases in this way with satisfactory results.

Warts on the Eyelids.—Warts on the eyelids are common and are sometimes difficult to remove. If they extend out from the skin they are best removed by ligatures, and when they slough off they should be touched with nitrate of silver once or twice a day for a day or two to destroy the roots. If they are flat on the skin scrape off the crust with a blunt knife and apply a little strong acetic acid, taking care that none of it gets into the eye.

Wounds to the Eyelids.—When the eyelids are wounded they need to be treated with great care, as they are needed to protect the eye. The edges should be brought together as carefully as possible and small pins put through the skin and cartilage

so that the inner margin will be as close as the outer. If the skin on the outer surface only is brought together the inner edge will gap and union will not take place. When the pins are placed through each margin, then tie a thread in the form of the figure eight around the ends of the pin; let them remain in until it heals. Pins are best for such wounds, as they will remain in much longer without sloughing than silk thread or suture wire. It will be necessary to put a wide bandage over it to prevent the disturbing of the pins. If swelling takes place, bathe with cold water.

Stricture of the Lachrymal Duct.—The lachrymal duct is a tube which extends from the inner corner of the eye to the nose to conduct the tears down to the nose, and anything that obstructs this causes the tears to flow over the cheek, irritating the skin, causing the hair to drop out. Very often this can be remedied by entering a small syringe at the top in the inner corner of the eye and forcing water down through it. If you do not succeed in this way it will be necessary to use a suitable "bougie" to dilate it; this may have to be used once daily for several days.

Cataracts.—Cataract is one of the sequels to periodic ophthalmia, although it appears without causing any inflammation, but is usually caused by some injury to the eye.

Symptoms: The first thing noticed is a gray or white speck (star-shaped) in the transparent part of the eye. In some cases they develop very rapidly and in others the progress is slow. As they

interfere with the sight, the animal becomes shyer; the derangement goes on until the lens becomes opaque and the sight is lost. Operations for cataract on animals are not practicable.

Fungus Haematodes.—This consists of a tumor in the cavity of the orbit. It appears at first as a dark red spot, becoming larger until it involves a part of the membrane of the eye and the lining of the orbit. The tumor is very vascular and is easily made to bleed and is malignant in its nature, being a medullary cancer infiltrated with blood, and is usually of a very rapid growth and is most commonly seen in cattle, although I have seen it in the horse.

Treatment: I have removed it successfully by injecting absolute alcohol into it in several places. This is the easiest and best way. It can be removed with the knife and the roots touched with nitrate of silver every second day for a week. When the bones of the orbit become diseased, which can be known by the very foul smell issuing from it, the animal should be destroyed.

CHAPTER XXIV.

ORGANS OF GENERATION IN THE MARE AND COW.

The organs of generation of the mare and cow are the vulva, vagina, uterus, fallopian tubes, and ovaries. The external part is called the vulva or "shape." This is the opening into the canal called the vagina. Immediately inside of this opening and on its lower part is a body called the "clitoris;" it is endowed with great sensibility and acts as an exciter of the generative system. The vagina is a musclu-membranous canal leading from the vulva to the uterus or womb. Its walls are thin, but are capable of great distension at the time of giving birth to the young creature. On the floor of the vagina and about four inches from the external opening is an orifice leading into the bladder. This opening is guarded by a fold or flap of membrane which can be easily lifted up with the finger; this opening is called the meatus urinarius.

The uterus or womb consists of a body, neck, and two horns. These horns are connected with the fallopian tubes, which lead to the ovaries. The neck and mouth of the womb extend a few inches into the vagina, which can be easily felt by passing the hand through the vagina. It is cone-shaped and somewhat hard to the touch. There is a small indentation on its end which can be opened with

the finger; this is often so tightly closed as to prevent the animal from becoming pregnant. The body of the womb is made up of three coats: the outside coat, or peritoneal, which is continuous with the lining of the abdominal cavity; the muscular coat is endowed with great power of contraction, and is the principal agent in expelling the foetus. The inner coat is mucous membrane. In the cow this membrane has a number of cone-shaped bodies attached to its inner surface, some sixty in number, called cotyledons. In the mare this membrane is smooth; the placenta or after-birth is attached to this membrane and is usually expelled at the time of the birth of the young creature.

The fallopian tubes are two canals which lead from the horns of the womb to the ovaries. They are two pear-shaped bodies situated in the lumbar region between the kidneys. When the spermatic fluid of the male reaches the uterus it finds its way to the fallopian tubes, through which it passes to the ovaries, where it meets the ova in the fallopian tubes and impregnation takes place. The fertilized ovum passes down through the fallopian tubes into the uterus, where changes occur which form into a living creature. It will be readily understood from this description that any obstruction to these fallopian tubes will cause barrenness. The ovum in passing the fallopian tubes receives materials from the walls of the tubes to form the covering called the chorion, the membrane which attaches the foetus to the inner membrane of the

womb. The inner membrane of the womb, by the time that the impregnated ovum reaches it, becomes thickened and velvety looking, and full of small blood vessels; and although the blood vessels of the one have no direct communication with the other, but being very vascular and in close contact, the blood of the mother, loaded with matters necessary for the growth and vitality of the young creature, is constantly going on between them. In the cow the points of connection between the mother and foetus are the cotyledons, already mentioned on the inner lining of the womb, and a number corresponding on the outside of the chorion of the foetus. The placenta or afterbirth is composed of three membranes. First: The chorion, the one already described. Second: The amnion, called the water bag. Third: The allantoid. The amnion contains a fluid in which the young creature floats, and the escape of this fluid is one of the earliest signs of parturition. The allantoid membrane is situated between the chorion and amnion and acts as a receptacle for the urine of the foetus, being connected by a tube called the urachus to the bladder. This tube at the time of birth is ruptured and shrivels up and the urine passes by the proper channel. In some cases, especially in the foal, the urine passes both ways on account of this tube not shriveling up. The umbilical cord or navel string is formed by this urachus and the blood vessels which pass from the chorion to the foetus. In the act of parturition this cord is usually ruptured. These membranes connected are what

form the afterbirth which usually comes away at the time of delivery.

STERILITY.

This happens more commonly in well-bred animals, especially in those that are forced by overfeeding. There are several causes. First: Disordered ovaries. Second: Obstructions to the fallopian tubes. Third: Morbid derangement of the uterus or womb. Fourth: Hardening of the neck of womb, closing the mouth of the uterus, etc. Each of these derangements will be described hereafter.

SIGNS OF PREGNANCY.

Improvement in condition of the animal, together with no desire for the male. As it advances the abdomen becomes pendulous and enlarged, the mare becomes slower in action and cross; by and by the udder begins to enlarge, also the membrane of the vulva and vagina. About the fifth month in the cow the calf may be felt. In the mare about the seventh month. The walls of the abdomen in front of the stifle being pushed up by the hand and the hand then removed the foetus will fall again, and can be easily felt as it falls down. In some cows and mares, even at this period, it is very difficult to give a decided opinion; and to make an exploration by introducing the hand into the vagina is not prudent, as the excitement may cause the animal to abort. As the period of delivery draws near, it will be easily seen. I will not take up the time of the reader on this subject.

ABORTION.

Abortion is the premature birth of the young animal. It is said to occur from the nature of the food the animal has been fed on, also the drinking water. In my practice I have never seen any cases from these causes. I have traced all my cases to injuries, fright, and disease of the foetus itself. It is sometimes epizootic. In this case I think it is a disease affecting the foetus in an epizootic form, as investigations have failed to detect anything either in the food or water. There is no substance that is known by experiment that will cause it, unless given in poisonous doses. When an animal aborts, it should be removed from the others, also the straw and afterbirth, as the smell or sight has a bad effect, and no doubt has a tendency to cause others to abort. Be careful not to take a mare that is in foal near where an animal has been killed or near a slaughter house. I have known a number of cases from this cause. A mare should never be forced up to a steam-engine or the cars if afraid of them. Abortion may occur at any period before the natural time of birth, but it usually happens in the first half of the period of gestation, particularly in the mare. Usually when it occurs in the early stage, it seldom interferes with the health of the animal, indeed it may take place and the owner be ignorant of the fact.

Treatment: If the animal is seen in time and the labor pains not severe, it may be checked by giving doses of the following: Powdered opium, two

drams every two hours in a bottle of oatmeal gruel until the animal is easy. Zundel recommends chloroform to be given in doses of three drams in a little gruel or linseed oil every half hour until three doses have been taken. Either of these medicines I have found to stop the pain and uneasiness, and prevented what might have been a case of abortion. In the majority of cases of abortion all that is necessary is to keep the animal quiet for a few days and feed on soft food. If the animal should be restless, showing symptoms of pain, give two ounces of tincture of opium every two hours in half a pint of water. If there should be a discharge from the vulva, inject a little of the following: Peroxide of hydrogen, one part; water, two parts, and give one ounce tincture chloride of iron at a dose in a quart of oatmeal gruel twice a day for a week or two.

CHAPTER XXV.

SIGNS OF PARTURITION.

The approaching signs of parturition in the mare are great distension of the udder with milk, restlessness, and often symptoms of colic. The mare should be watched, the watcher being in a position to see the mare, but not to be in the stall or box with her, as the presence of a person disturbs the animal. It is very important that the mare should be looked after at this period, as several things may happen that could easily be put to rights. The mare might be in a bad position, or, as occasionally happens, if the membrane covering the foal is not ruptured, it will become suffocated, and it will die in a few minutes. The mare sometimes tears it off, and if she does not it is the duty of the watcher to do so. I have seen numbers of colts lost from this cause; besides, he will be able to see if the animal is making any progress. After the mare has made several ineffectual attempts to expel the foal, no time should be lost ascertaining the cause of the delay, and assistance should be given as soon as possible after parturition has commenced, as the foal soon dies, unlike the calf in this respect. In the mare there may be some swelling of the belly in front of the udder, and sometimes swelling of the hind legs; unless very great it does

not require any treatment, as it will pass away as soon as the mare foals, but if it is great and some time before the animal's time of foaling it will be necessary to give her some medicine. Take nitrate of potassium two ounces, and divide into six doses, and give one twice daily in the water the animal drinks, or a small bran mash. This quantity may be repeated if necessary. There is no danger of this medicine doing the mare any harm, and it will assist in removing the swelling.

Signs of Parturition in the Cow.—There is great looseness of the vulva, and a giving way of the ligaments of the pelvis, and the udder is usually distended with milk. When the time for delivery is near at hand the animal becomes restless and separates from the others, lies down, rises again quickly, and shows signs of pain. This may continue for some time before parturition takes place. When active labor pains set in the first symptom is the appearance of the inner membrane of the covering of the foetus, the amnion, called the water bag. Soon the fore feet make their appearance, and if everything is right, the head, resting on the knees, shows itself. If the foetus is not too large interference is unnecessary. There is often mischief done by being too hasty, as in some cases nature takes considerable time to prepare the parts. Usually the mare is only a few minutes after the commencement of labor, but in the cow, even when the parts are all right, it may be an hour or more before it is accomplished. If the animal has been in labor for some time and no

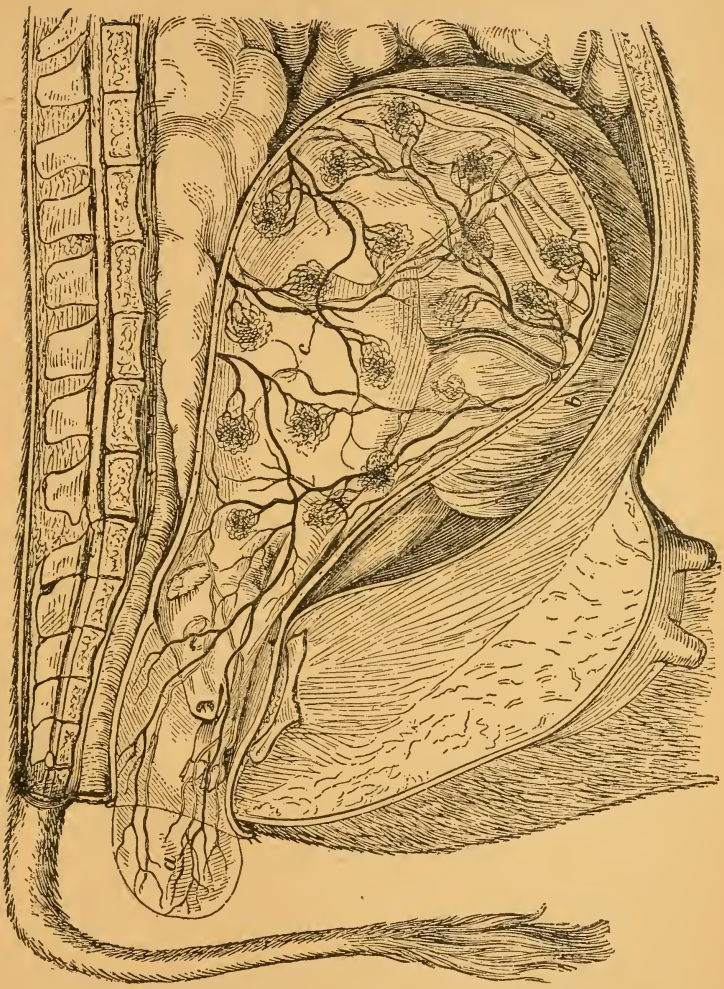

PLATE 9. SHOWING THE NATURAL POSITION OF THE FOETUS AT THE TIME OF BIRTH.

progress having been made, it will then be necessary to make an examination with the hand. Oil the hand with any kind of oil or lard and gather the fingers together and introduce them into the vagina with a rotary motion. On reaching the foetus you will ascertain the cause of delay. In its natural position a little assistance may be necessary. This is best done by pulling gently on the feet every time the animal strains. It may be necessary to put a small rope on the lower jaw as well as on the feet. The only obstacle which can occur is that the foetus may be too large for the passage of the mother; it will then require considerable force. This can be done without any danger to the mother by taking advantage of every labor pain and giving time for the parts to relax. On the other hand, if you find the mouth of the womb closed, or not open large enough to allow the foetus to pass, it will be necessary to dilate it. This can sometimes be accomplished by moving the fingers or hand in it. If you make no progress in this way you will have to use belladonna extract, taken in on the fingers and smear it over the mouth of the womb. Also give the animal from two to three drams of chloroform in a little oil, then allow the animal a few hours' time, when it usually gives way. Warm water injected against the mouth of the womb is useful, and ought to be tried when other remedies are not at hand. If all means fail an operation will have to be performed, which is done by making three incisions, one on the upper and one on each

side, dividing the constricted ring, which then gives way, and usually the animal does well. I was called to the country to see a cow that had been in labor for two days. At 8 p. m. I made an examination, and found the mouth of the womb closed and hard; it would only admit the one finger. I applied belladonna extract, and gave three drams of chloroform in a little linseed oil. I went to rest, leaving orders to be called at 12 p. m. On examining I found very little progress had been made. I injected hot water per vagina against it for one hour, applied more belladonna, and gave half an ounce of chloroform. Two hours after I again examined it and found I could pass my two fingers and soon my hand. In a short time it completely gave way, and delivery was soon accomplished.

If we find on examining that the foetus is in such a shape that it cannot be born, our first step is to place the mother in a position that will throw the contents of the abdomen forward and also prevent her from straining. This is best accomplished by making a hole about eighteen inches deep, placing the animal's four legs in it and keeping them there by an assistant. The operator will have very little difficulty in putting the foal or calf in its proper position. This particular has been overlooked by writers on this subject. I have been called to cases where a veterinary surgeon had worked for hours trying to put the foetus in its natural position, but failed. By adopting this plan I relieved the animal in a few minutes. Hundreds

of animals are lost yearly that could have been saved had this method been known. In cases where the animal is unable to stand I find the only way we can do is to place the animal on its side; whichever one suits the operator best.

INSTRUMENTS.

The only instruments necessary (unless for cases of malformation) are a crutch and three small ropes; cotton rope is the softest and best. The crutch can be made by any blacksmith. This is made with a crutch three inches wide with blunt ends, and a shaft two and a half feet long, ending in a ring.

PLATE 10. CRUTCH OR REPELLER.

The crutch is only necessary when the operator requires assistance in pushing the foetus forward. Hooks of all kinds are dangerous, as they are apt to slip and injure the womb. I have found in my practice in all cases where I could reach to put in a hook to be of any service, I could put on a rope and avoid all danger. I have known of valuable animals so injured by the hooks slipping that they died, when it was unnecessary to use them. In cases of malformation it may be a necessity to cut the foetus and remove it in pieces; and in cases of this kind hooks are at times useful, and we have to run the risk of wounding the mother. They will be described in the chapter on that subject. We will now consider some of the cases which require

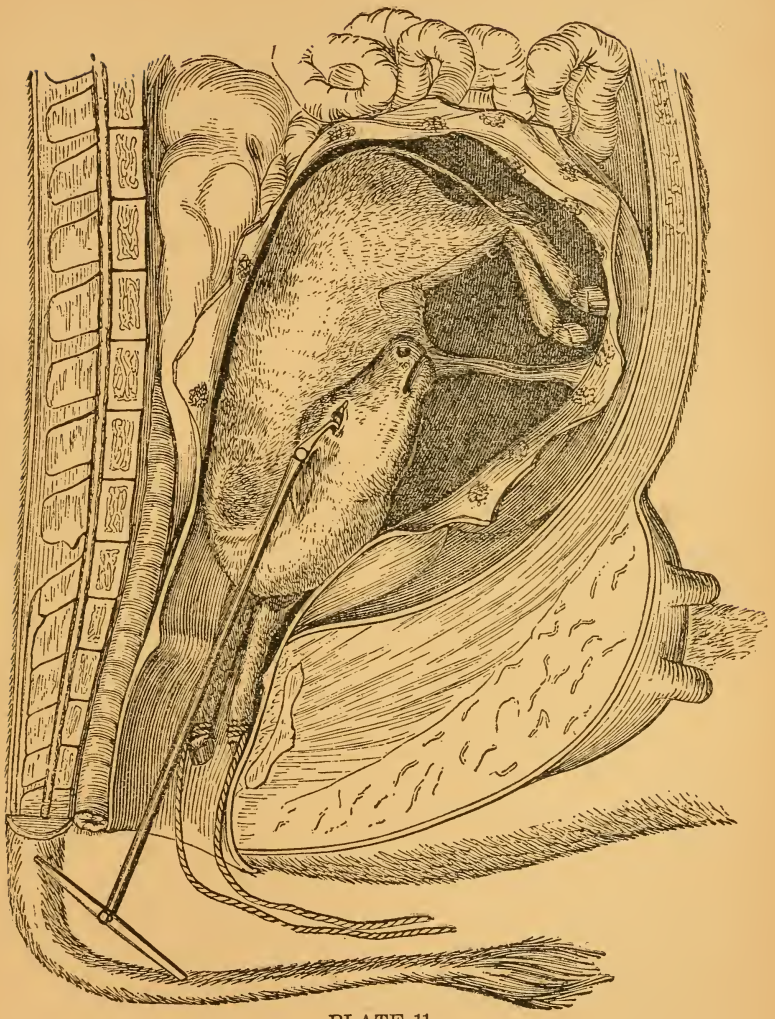

PLATE 11.

assistance to put them in proper position for delivery.

A very common form (Plate 11) is when the fore feet are presented without the head, which is either doubled back on the shoulder or between the fore legs. In this case place the mother in the position directed above, then tie a small rope on each pastern; this done push the foetus back into the womb, then feel for the head and bring it up into the passage with the hand; if this cannot be accomplished, put a rope with a noose under the lower jaw. The assistant will pull on the rope, while the operator guides the head into the passage, then bring up the fore feet, by pulling on the ropes attached to the feet; when this is done then let the animal out of the hole and lie down if it chooses. Assist the animal every time it strains by pulling one of the ropes, whether in the standing position or lying down. This is usually an easy case. On the other hand, if the animal is not able to stand, the case is much more difficult. In this case turn the animal on its side, whichever suits the operator best, then rope the fore feet and push then back into the womb. If this cannot be done place the crutch against the shoulder or chest of the foetus, the assistant to push on the crutch; when the legs are pushed back feel for the head and rope the lower jaw and bring the head into the passage, then bring up the feet and deliver as above. I was called to see a cow that had been in labor for twelve hours; she was unable to stand, and the parts were much swollen from fruitless

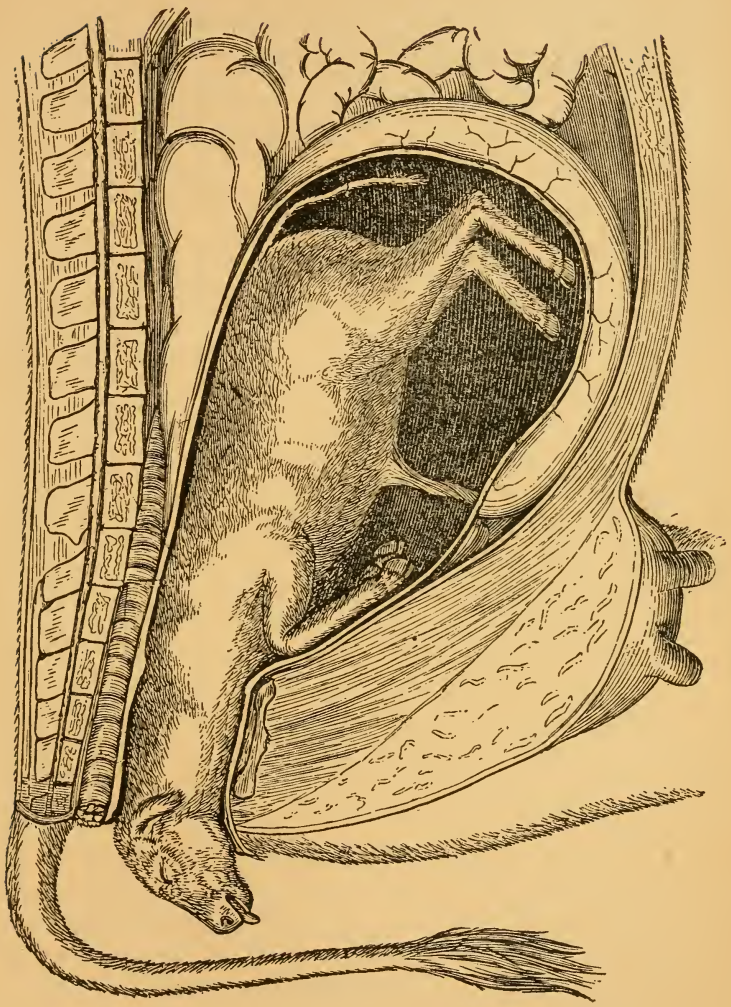

PLATE 12.

attempts to assist her. On examining I found it impossible to straighten the head, which was turned back on the shoulder. After some difficulty I succeeded in getting a noose over its nose, and with the assistance of two men pulling on the rope we succeeded in bringing it into the passage by breaking the bones of the neck. It must have grown in this shape. The fore legs were then sought for, roped, and brought into the passage, and delivery was accomplished without any further difficulty.

The next case (Plate 12) is where the head is presented and the fore legs are down in the womb. Put a rope on the lower jaw, the animal being put in the proper position, then push the head into the womb and feel for the front feet; tie a rope around each pastern. When this is done the assistants pull on the ropes attached to the feet, the operator guiding the feet with his hand to prevent them from wounding the womb. When this is accomplished bring up the head. The animal is then allowed to lie down if she chooses, and assist her in every effort she makes by pulling on the ropes until delivery is completed. In cases where the animal cannot stand and the foetus is dead, it is best to remove the head. This is done by cutting through the skin in front of the ears, then skin back to the third bone of the neck, then cut off, leaving the loose skin to tie a rope to. The animal being turned on her side, push the part back into the womb. If this cannot be done with the hand, use the crutches before directed. When this is

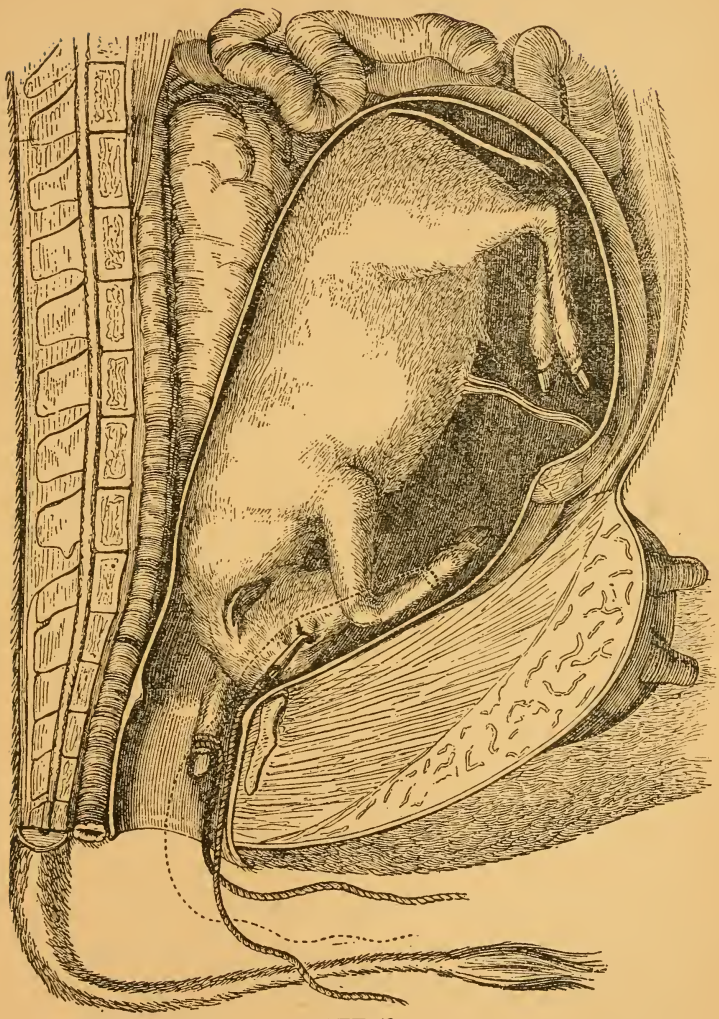

PLATE 13.

accomplished rope the fore legs and bring them up, then bring the neck of the foetus also into the passage, and deliver as above. In cases where the head is in the passage, but not born, it is best to put a rope on the lower jaw and push it back into the womb, feel for the fore feet and rope them, and bring all into the passage. Considerable force can be used when the parts are brought into position. In no case try to deliver by the head until the feet are brought into the passage, as it will make the case more difficult and endanger the life of the mother.

The next form (Plate 13) is one fore leg presented, the other one being down in the womb and the head against the pelvis. First secure the leg presented, rope the lower jaw and the other fore leg, and bring all up into the passage, then draw steadily, the feet being a little in advance of the head. The only difficulty in this case will be the position of the mother. If she is not able to stand the leg presented will have to be roped and pushed back into the womb, using the crutch if necessary. This has to be done when the animal is lying down in order that the operator will have room to secure the head and foot not presented.

The next unnatural position (Plate 14) is where the young creature is lying on its back with head presented. This is said to be a difficult case, but when the mother is put into the position already described it is not a difficult one. The first proceeding is to turn the foetus, rope the lower jaw and both the fore legs, pass one of the ropes over

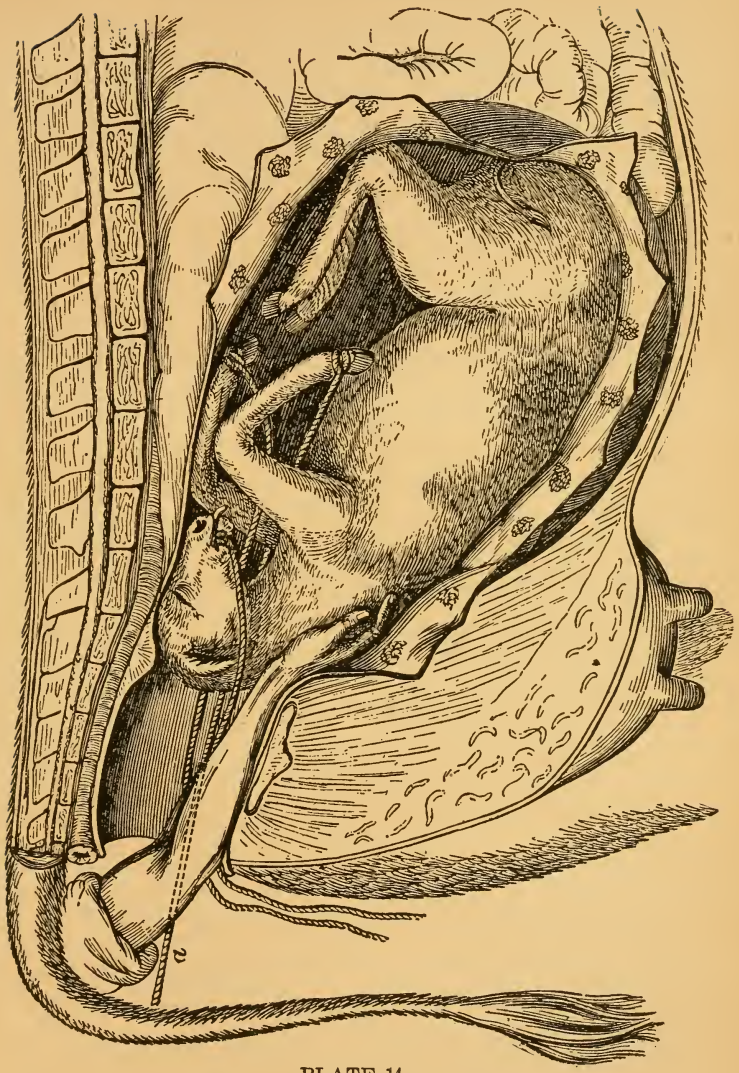

PLATE 14.

the opposite fore limb, let the operator pass his hand firmly gainst the withers, and the assistants pull on the rope on the other side of the limb. Usually the foetus will turn easily, then bring head and feet into the passage and deliver as above described. If all our efforts should fail to turn the foetus, bring the head and fore legs into the passage. I find cases of this kind facilitated by using lard or oil to the parts as well as to the foetus. By pulling well up and using considerable force I have succeeded in delivering in this position without injuring the mother. There is less danger to the life of the mother by using well-directed force than by having recourse to the cutting away of the foetus.

Plate 15.—Another very common presentation is where the back and tail only can be felt. This is considered a very difficult case to deliver, especially in the mare. I do not find much trouble in this, as the head of the foetus is usually in the fore part of the womb. By putting the animal into the proper position and pushing the foetus forward, it turns to a certain extent, which brings the hind legs up toward the passage. Feel for the hind feet, and if you cannot reach them put a rope around the hock, let the assistant pull on the rope while the operator pushes back the breach or hips of the foetus. When this is accomplished remove rope to the fetlock. While the assistant is pulling on the rope the operator will take the foot of the foetus in his hand to prevent it from injuring the womb; when the two hind feet are brought into the passage feel for the tail; the operator will pull

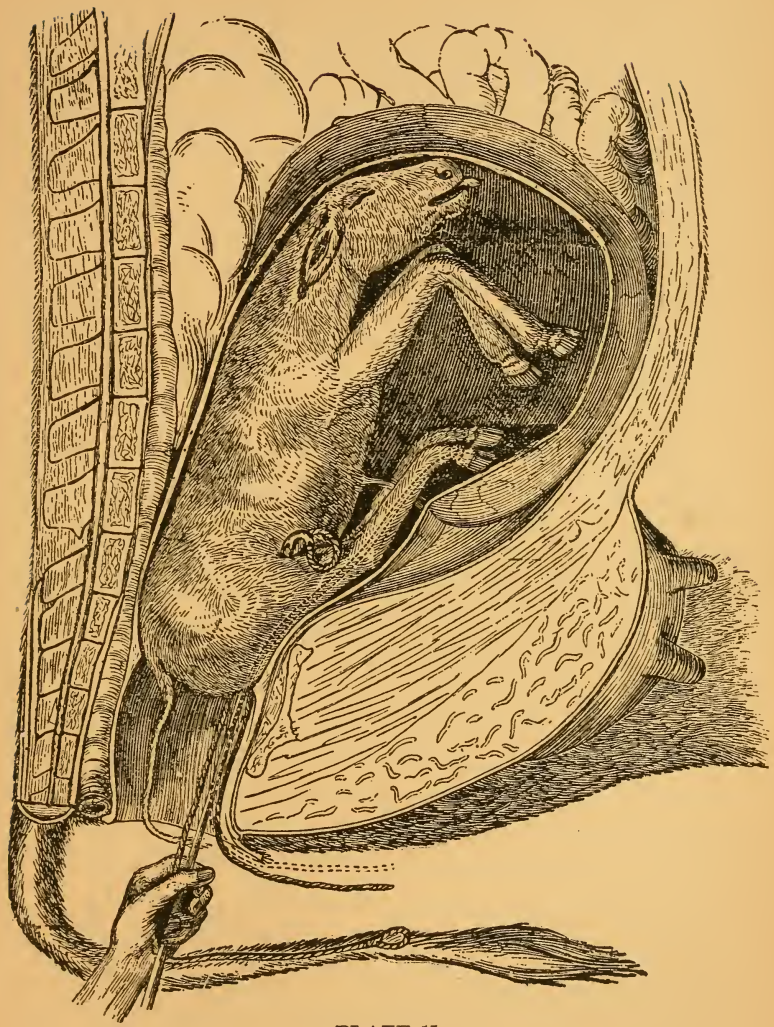

PLATE 15.

on the tail of the young creature; also place the hand under the breach and guide it into the passage. When this is done delivery will be easy. If the animal is not able to stand it will be necessary to use the crutch and an assistant to push it back as far as possible. The crutch will have to be kept against the hip of the foetus while the operator is searching for the legs to prevent it from being forced against the outlet by the violent straining of the mother. When the legs are found put the ropes around the hock, drawing them up, while the assistant is pushing on the crutch; next secure the feet in the same manner as above. This form usually takes time, as the operator has to rest his arm, as it soon becomes useless from the pressure on it, caused by the violent straining of the mother. I have had a number of cases of this kind in the cow. By persevering I have always been successful in delivering the animal without having to cut away the foetus.

Plate 16.—In cases where the hind feet are presented and not born, great care is required in getting them through the passage, especially in the mare. If the foal should be turned on its back the feet will be against the roof of the vagina, which is apt to be torn by the feet. Rope the fetlocks and push back into the womb, then try and turn it. If this cannot be done the assistant will pull on the ropes while the operator will guide the feet through the passage. Search for the tail and bring it up and assist the hips to enter the passage; that done delivery will be easy.

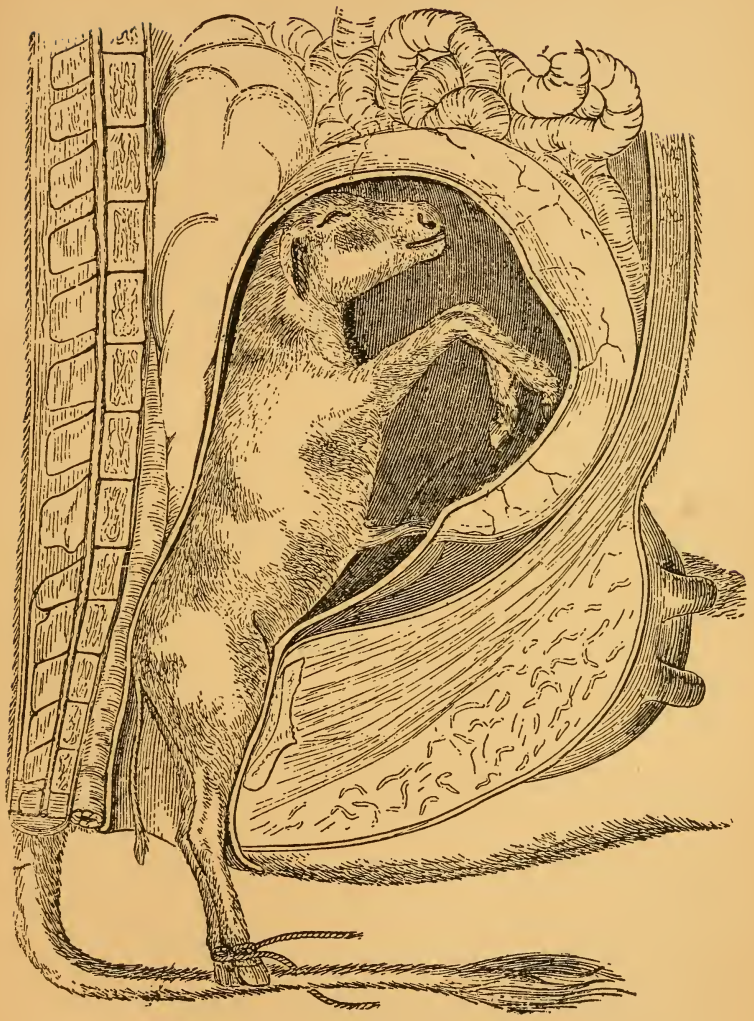

PLATE 16.

In cases where the head and fore feet are presented as in the natural position, but the animal makes no progress. Make an examination and find the cause, as in this plate I have found the hind feet as far back as the head, the hocks against the brim of the pelvis, and the body of the foetus bent, blocking up on the outlet, and the more force used the firmer it would become wedged, so no force should be used until the foetus is put in proper shape. In this position rope the lower jaw and the two front feet and push the foetus into the womb, sufficiently so that you can get the hind feet and push them well into the womb, then bring the head and fore feet into the passage. Usually there will be no further trouble.

In cases where all fore feet are presented. First ascertain which are the fore legs. This can be easily done by slipping the hand up to the knee. The difference between the hock of the hind leg and the knee of the fore one is such that there is no danger of making a mistake. Feel for the head and when found rope the lower jaw and the fore feet, and while the assistant is pulling on the ropes the operator will push the hind legs into the womb as far forward as possible. Then delivery will be easy. But on the other hand if you cannot reach the head, rope the hind feet, and, as before, push the fore feet into the womb while the assistant is pulling on the hind ones, and deliver as described in breech presentation.

In cases where nothing but the round back of

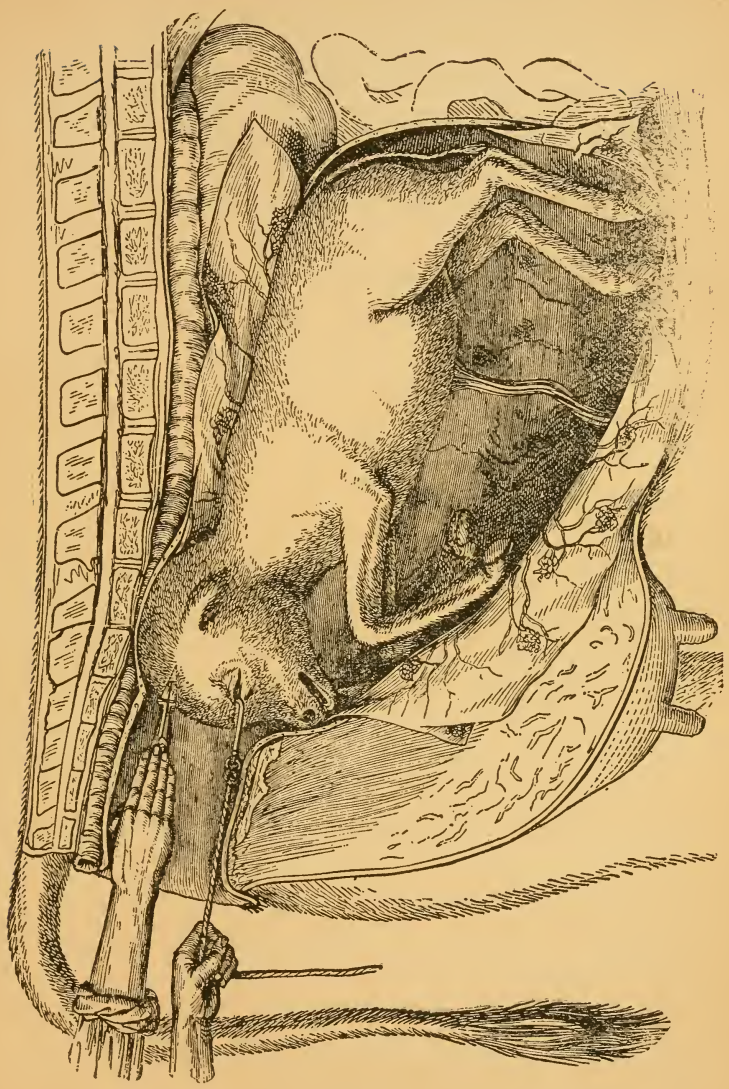

PLATE 17.

the foetus can be felt. First find by examining whether the fore or hind parts are easiest reached. The distinguishing points are the withers on the fore part and the high hunch bones on the hind. Having determined the best way to proceed, place the crutch on the part you wish to push into the womb. In pushing one part forward it brings the other part nearer passage. Feel for the head and rope the lower jaw, then the fore feet. Having done this bring all up into the passage and deliver. If not successful in this way put the crutch on the fore parts and push into the womb and bring up the hind legs. I have succeeded in more than one case in this way.

Twins.—This is a case of twins. Sometimes we will find the two fore feet and head of one and the two hind feet of the other. This is not a difficult case. Usually they are much smaller than when there is only one foetus. Push back the hind feet into the womb; usually the other will be born without assistance. I have met with cases in which the hind foot of one foetus and the two fore feet of the other were presented. In this case push the hind foot into the womb, rope the two fore feet, push them in also, feel for the head and rope the lower jaw. Then bring the head and fore feet into the passage. Before proceeding further examine and see that the head and fore feet belong to the same calf, as it could not be delivered, and I have known of such cases. After delivering the first foetus search for the second and deliver by which end is most convenient.

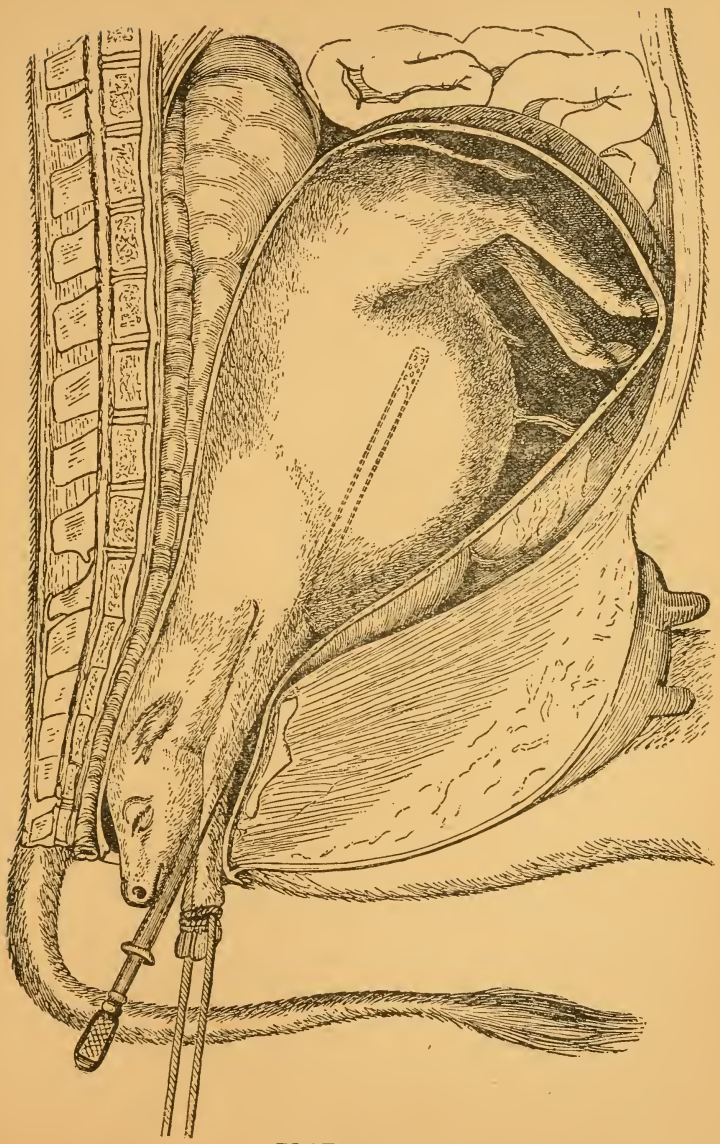

PLATE 18.

There is very seldom any trouble, as they are usually small. In all cases after delivering an animal search and ascertain whether there is a second foetus or not, as cases have come under my notice in which a second was born a week after the delivery of the first, which might endanger the life of the mother from blood poisoning.

DISEASES OF THE FOETUS WHICH IMPEDE DELIVERY.

Plate 17.—Dropsy of the Brain (Hydrocephalus). I was called to a case of a cow that could not calve. On examining I found the head very much enlarged, so much so as to make it impossible to be born. I concluded it was a case of dropsy of the brain. I put a rope around the lower jaw of the young creature and pulled it as far into the passage as possible. I punctured the bones of the head, and a great quantity of fluid escaped. The plan of operation is to put a rope around the neck of the foetus and bring it as far as possible into the passage, the assistant to pull on the rope to keep it firm; then with a sharp pointed instrument placed against the forehead of the foetus and a sharp tap given with a hammer it will easily pass through the soft bones of the head, thus allowing the fluid to escape. I once used a harrow tooth, no other instrument being at hand. Usually after the escape of the water and a little force used on the rope around the neck, the bones of the head will collapse, they being in separate pieces in the foetus.

Plate 18.—This is a form of dropsy of the abdomen, called ascites, which is sometimes met with; and on account of the distended abdomen it would be impossible for it to pass through the passage. Once I was called to see a mare that the owner had been trying to deliver for several hours without success. The head and fore feet were born, but he had made no progress, although considerable force had been used, and it would not budge, as the farmer said. I pushed the foetus back into the womb (that part of it born), and examined the body and found it very much distended with fluid.

Mode of operation: Place a small knife in the hollow of the hand and introduce it into the womb, press the blade of the knife into the abdomen of the foetus and the water will escape, the belly will collapse, and delivery will be accomplished easily.

Embryotomy, or the Cutting Away of the Foetus. —This is no easy operation, but ought to be tried when all other means fail. The difficulty in this operation is the hand of the operator soon becomes useless on account of the violent straining of the mother pressing the foetus into the passage. The hand is squeezed between it and the bones of the pelvis and it soon has the feeling as if it were paralyzed and has no power to operate. Having decided to operate, our first object will be (if a fore limb) to remove it. This is best done by concealing a small knife in the palm of the hand (a knife with a ring for the finger is the best); make a deep incision from the fetlock to the shoulder of the foetus. The skin should then be separated from the

leg by running the fingers between the skin and the muscle; when this is done by using considerable force the whole of the leg can be pulled away. The other leg must now be served in the same manner. Then attach ropes to the loose skin. The next step will be to secure the head; this will be easy on account of the legs being removed. Put a rope around the lower jaw and bring it into the passage, then by using force on all the ropes the foetus will usually be easily gotten away. In cases where we fail in our efforts to bring the head into the passage on account of some deformity, we must try and remove the head. This is best done at the first or second bones of the neck, which, with a strong knife, may sometimes be effected, and with the aid of the fingers and knife the head may be altogether detached. No further opposition will be experienced in effecting a delivery. It may be necessary in some cases of breech presentations to remove the hind legs. This is best done by introducing the knife with the ring, or a very short knife, concealed in the palm of the hand, making an incision through the skin and muscles over the hip joint to the bone. Then fix a rope around the thigh, and by strong traction the bone of the leg may be torn out of its socket. I have succeeded in this way in a few cases. Before attempting delivery make an incision through the walls of the abdomen, remove the bowels with the hand, and put a rope around the loins; when this is accomplished you will have no further trouble in delivery. There are

other forms of unnatural presentations, but enough has been said to enable the operator to use his own judgment on any variation that might present itself from those already described. One of the difficulties we have to encounter is the size of the foetus in comparison with the passage of the mother.

I may say from practical experience that a great deal of steady force can be used, occasionally stopping to allow the parts time to relax and rest the mother. If the parts have become dry the injection of oil will be of great service.

CHAPTER XXVI.

ACCIDENTS AND DISEASES FOLLOWING PARTURITION.

Retention of the Placenta, or Afterbirth.—This seldom occurs in the mare, but is common in the cow. In the cow the afterbirth is usually retained for some time after the calf is expelled; but in the mare at the time of expulsion of the foal. If it is not thrown off soon after the birth of the foal, it acts as a foreign body and causes considerable disturbance to the health of the mare. It is best to remove it within a few hours after birth. On the other hand, in the cow, it is best not to remove it until after the third day, as it does not seem to do the cow any harm until decomposition takes place. The decomposing membrane is liable to become absorbed into the system, and if the animal does not die it usually does not thrive well. The reason for not removing earlier in the cow is that the placenta adheres to the cotyledons on the inside membrane of the womb (already described), which are very vascular and easily made to bleed, and forcing them away too soon might cause troublesome bleeding. There are no cotyledons on the womb of the mare, hence little danger of bleeding by their early removal. All the so-called cleansing medicines usually do harm. In my practice I find that medicines have no action or power to expel the afterbirth. The

hand is the only safe and proper method for its removal. The operation is simple. See that the finger nails are short so that they will not wound the soft parts, then oil the hand and introduce it into the womb; carefully separate the afterbirths from its connections with the cotyledons; then wash out the womb with warm water, in which a little carbolic acid has been well mixed. Half an ounce of the acid to a pail of water. In order to have the acid thoroughly mixed put the acid in a bottle of water and shake up well, then put it into the pail. A good large syringe is the best means to inject the water into the womb. In the absence of a syringe a sponge or piece of soft muslin will answer. After a few days if there is a discharge of a foul-smelling matter from the vagina it will be necessary to wash out the womb again with warm water and carbolic acid as before. Also give the cow a dose of physic. The best is Epsom salts one to one and a half pounds dissolved in a half gallon of cold water; also put a couple of teaspoonfuls of ground ginger in it. After the physic has operated then give the following in food twice daily: Sulphate of iron two ounces, pulverized gentian two ounces, mix and divide into twelve doses, one to be given morning and night in bran mash until all are taken. This quantity can be repeated if necessary. If the animal should get into a weakened condition from the effects of deleterious materials absorbed from the womb during the decomposition of the afterbirth, which sometimes takes place, the symptoms are: Com-

plete loss of appetite, pulse quick and weak, and almost imperceptible at the jaw, breathing fast, and usually followed by diarrhoea, and as before mentioned a very foul-smelling discharge from the vagina. At this stage of the disease unless proper means be taken the animal soon dies. The treatment must be of a stimulating and tonic nature. I find the following prescription very valuable: Sweet spirits of nitre two ounces, tincture of gentian two ounces, tincture of ginger two ounces, tincture chloride of iron one ounce, mix and give at one dose in a quart of oatmeal gruel. A dose of this kind should be given three times daily until reaction takes place.

Inversion of the Urino-Genital Organs.—This is a derangement more common in the cow than in the mare, and is usually attended with danger to the life of the animal, and prompt measures must be taken to restore the parts to their natural position. Inversion of the bladder is not common, but from violent straining it may occur, especially in the cow and mare, and is often fatal. If completely inverted and has been in that state for some time, the walls become swollen and render its return almost impossible. The symptoms are a large tumor between the lips of the vulva, or shape, and a constant dripping of urine from the ureters (the canals which convey the urine from the kidneys to the bladder); the animal will make attempts to pass urine, but will fail to do so.

Treatment: Give the animal a dose of opium, from one to two drams, either in a ball or in gruel.

Bathe the part well for half an hour with warm water, in which put two ounces of tincture of opium. After this is done put the animal in a standing position, the fore parts lowered, then by gentle pressure on the center part of the bladder it will usually return to its proper place. If all our efforts fail to return it excision may be tried. This is best accomplished by tying a small cord tight external to the ureters, or canals, so as not to stop the urine. This done, take a sharp knife and remove all external to the cord or ligature. In a few days the portion with the ligature will slough off and the parts will heal without any further treatment. There will always be an incontinence of urine, but this is not of much importance in the cow or sow, as they can be fattened. In cases where the bladder has been returned the animal will require to be watched for a few days until the irritation has passed off. The animal must be kept with its hind parts elevated a little, and be given a dram dose of opium three times daily, if necessary, to allay the irritation.

Inversion of the Vagina.—This occurs before parturition and is caused by debility, usually the result of being poorly kept or from standing on a slanting floor.

Treatment: Put the animal in a position where her hind parts will be elevated slightly. Bathe the part well for half an hour with warm water and clean it well, then return by pressure with the hand. Give the animal good food and a dram dose of opium three times daily until straining ceases.

I find it necessary sometimes to put on a truss, which will be described in Inversion of the Uterus. After the birth of the young creature there will be no further trouble.

Inversion of the Uterus.—This very troublesome affection known as falling down of the womb is common to cows; but may happen in the mare. The immediate cause of inversion is relaxation of the ligaments of that organ, whose duty it is to retain it in its position. It is further aggravated by the congested and enlarged state. This is brought about by debility of the animal and rough handling at the time of parturition; also, the animal having to stand or lie on a slanting floor; and to make matters still worse it is usually too short for the animal's body. Cows in calf should never be put into a stall of this kind. A little attention to the animal's comfort, good food and exercise, and this troublesome affection would be of rare occurrence. The great difficulty in returning this organ is quite apparent when we consider its vast bulk in comparison with the passage of the vagina, and also the violent expulsion of the mother. This latter can be counteracted by placing the animal with its fore feet in a hole as before described. Our first object will be to have it well washed and all straw and dung removed. If the afterbirth, or part of it, is still adhering to it, carefully detach all, and if there should be much bleeding, bathe well with cold water. Put half an ounce of sugar of lead to the pail of water; this will soon stop the hemorrhage. The womb being thorough-

ly cleaned and put into a clean cloth and supported by two assistants, one on each side, and the animal put into the position before mentioned, the operator will commence by putting a hand on each side of the neck of the womb and press as much as possible of it in, then place the fist against the fundus or lower part, and by steady pressure it will usually return. The operator will retain his hand in it for ten or fifteen minutes, moving it in the womb. This assists in placing it in its proper position. I have found it necessary in some cases to take a small piece of ice in my hand into the womb, and move it about to assist in causing the organ to contract. If the animal is unable to stand there will be great difficulty in returning it. In the recumbent position it is not easy to prevent the violent straining of the mother, which the strength of the operator would not be sufficient to combat. I have succeeded in some cases in lessening the straining by giving opium in two-dram doses in a little gruel. Dobson says: "There are cases, however, in which from the great size of the uterus, swelling, and violent expulsive pains, it will be found difficult or absolutely impossible to return it. The animal should here be put on her back and her hind parts raised by means of pulleys, when the return will be very much facilitated." I have succeeded in a few cases in this way, and it should be tried when others fail. After it has been returned it will be necessary to prevent the animal from expelling it again. Give the animal two drams of opium in a little oatmeal

gruel and put on a truss, which can be easily made as follows: Take a piece of leather about ten inches long and six inches wide, and make a hole in each corner (the leg of an old boot will answer) large enough to admit the finger; fix a rope in each hole long enough to reach the neck. Put a rope or strap around the neck, withers and loins. Place the leather over the vulva, or shape; pass two of the ropes attached to the leather down be-

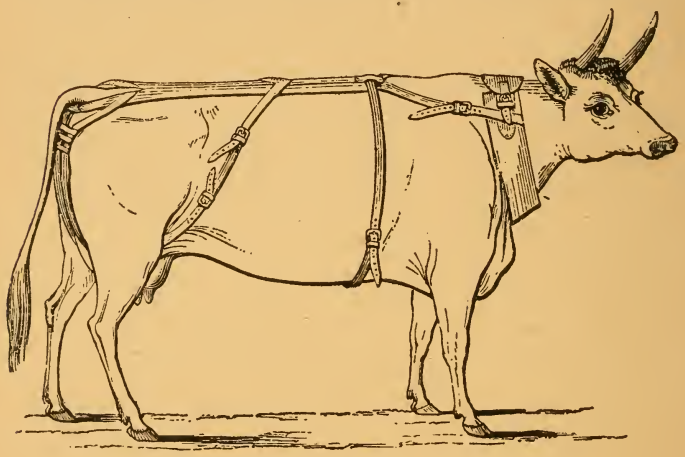

PLATE 19. REPRESENTING THE TRUSS.

tween the hind legs, along each side of the udder, along between the fore legs, and tie to the strap around the neck; also fix them to the ropes around the loins and withers, the two upper ropes to be passed along the back and tied also to the strap on the back, and your truss is complete. The animal requires to be watched and the ropes tightened or adjusted if necessary. The truss should

be worn for at least ten days. In cases where it is impossible to return it, mortification will soon set in, or the animal may die from collapse. In this case an operation is necessary, and is easily performed, and some cases of recovery have been reported. Tie a ligature tight around the neck of the womb and with a sharp knife remove all external to the ligature. In a few days the ligature will slough off, and no after treatment is necessary.

DROPSY OF THE UTERUS.

This disease seldom occurs in the domestic animal. A few cases have been reported.

The symptoms are those of pregnancy. The affected animal is thought to be in this condition until the period of gestation passes without any signs of parturition. Upon examining the womb it is found to be greatly enlarged and fluctuating when pressed upon.

The treatment consists in opening the mouth of the womb with the fingers and the fluid will escape. In some cases a trocar will be required to pass in and draw off the fluid. As there is a tendency for the fluid to accumulate again, a cure is impossible; and if the patient be a cow it should be fattened for the butchers.

MAMMARY GLANDS, OR UDDER.

This is divided into four compartments in the cow and two in the mare. It is made up of a number of glands well supplied with blood vessels; these glands secrete the milk from the blood.

During pregnancy there is an increased quantity sent to the udder. As the animal nears the period of parturition, the udder being distended with milk, the great supply of blood to it makes this organ very sensitive and easily inflamed; this is more especially the case in the young cow with her first calf.

Mammitis, or Inflammation of the Udder.—This disease is known as "garget," and consists of inflammation of a part or the whole of the organ. It is a common disease in the cow, but rare in the mare. By care and good management this disease can nearly always be prevented. When the udder becomes greatly distended with milk (which it often does before parturition) it should be relieved by drawing off some milk, and if hot and tender should be bathed with warm water for half an hour at a time at least. This will be a great relief to the animal, as well as preventing the udder from becoming inflamed. There is a prevailing idea among farmers that milking a cow before calving is an injury and prevents or prolongs the period of calving. This is a mistake, as there is nothing we can do that will interfere with nature in this respect. I have had cases tested, and found no difference in those that were milked a few days previous to parturition and those that were not; it should be done in all cases where the udder is much distended, thereby relieving the suffering animal and saving the owner from loss.

Causes of garget, or inflammation of the udder, are injuries, as blows, kicks, scratches, and being

horned by other cows; also by the udder being over-distended with milk, either before or after calving. When this organ is inflamed the inflammation causes the milk in it to coagulate, separating into curds and whey. When the teats are drawn, shreds of coagulated milk come away mixed with whey. This curdled milk sometimes stops up the orifice of the teat and allows nothing to pass through it. This is a bad complication, often destroying part or the whole of the udder. It may arise from the animal being in too plethoric a state, and being fed on sloppy food. It may occur without any apparent cause. It is said hot weather has a tendency to produce it.

Symptoms of mammitis are increased heat, redness, swelling and pain. As the swelling increases it becomes hard and very tender to the touch. The animal will show much distress if made to move, and lameness in one or both hind legs. When very much distended the animal will be stiff and not inclined to move unless forced to do so. In bad cases the animal will show constitutional symptoms characterized by loss of appetite, dry nose, quick pulse, seventy to eighty per minute, labored breathing. Instead of milk coming when the teats are drawn, a thin whey mixed with curd. Later on the discharge becomes fetid and thick. If the disease is not checked there is a tendency for matter to form; when this takes place the part will become white in color, and pointing; this will break usually of its own accord, leaving a deep, ragged ulcer. Sometimes

gangrene or mortification will take place, which is easily seen by the dark appearance of the part affected. If this is not removed it will soon destroy the animal.

Treatment of mammitis consists in relieving the inflammation; this is best accomplished by giving the animal a dose of physic, one and one-half pounds of Epsom salts, pulverized ginger one ounce, dissolved in half a gallon of cold water, and give all at one dose to the cow. For the mare a quart of raw linseed oil. After the medicine has operated, give to both mare and cow half an ounce of nitre of potass. twice daily in the water the animal drinks. Continue this for three or four days if necessary. From the first, bathe the udder well for one hour three times daily with hot water; after each bathing rub in well a little of the following lotion: Acetate of lead, half an ounce; sulphate of zinc, half an ounce; soft water, one quart. Shake up well before using; continue this until the inflammation is all gone. This plan of treatment I have found to be very successful. In cases where the udder is very much distended I find benefit from putting a wide piece of cloth around the loins to support the udder, with four holes for the teats. The milk should be drawn from the bag frequently; or better still, allow the calf or colt to suck; as a rule it can do better than one can do with the hand. I have never known the young animal to be injured by sucking the mother while in this state. Notice should be taken that the young creature cleans out all the

teats. I have seen cases where one of the teats had been left untouched. If the matter should form in spite of all our efforts, warm poultices of linseed meal should be applied, and when the abscess is ready it should be opened with a sharp knife, and when the matter is all discharged the wound should be dressed with a little of the following lotion: Linseed oil, five ounces; carbolic acid, two drams; camphor gum, two drams; mix and shake up each time it is used. Twice a day will be often enough to dress it. If well attended to, it usually heals without doing much damage to the udder. In cases where mortification sets in, it is easily distinguished by its dark color; is insensible and cold to the touch. When cut into, instead of bleeding a little, a dark-colored fluid will exude from the cut.

The treatment requires to be of a stimulating and tonic nature. The following I find to be a good one: Sweet spirits of nitric ether, two ounces; tincture of ginger, two ounces; tincture of gentian, two ounces; mix and give at one dose in a quart of gruel. Give a dose of this size three times daily until the animal is well. In order to save the life of the animal all the mortified part will have to be removed by the knife. I have operated on several cases with success. As an illustration, I will describe one of the cases operated on. I was called to see a short-horned cow which had been suffering from a severe attack of inflammation of the udder for several days. I found the animal in a bad state, the udder very much

enlarged and one-half mortified. The cow could not rise without assistance. The pulse was imperceptible at the jaw, breathing short and quick, the appetite completely gone. I gave the cow a good stimulant composed of sweet spirits of nitric ether, two ounces; aromatic spirits of ammonia, one ounce, in a pint of cold water. We then assisted the animal to the lawn, where we cast her on her left side, on account of the right side of the udder being involved. I secured the head and fore feet to a tree close by, the hind legs to another, thus putting them on the stretch, leaving the udder all exposed and plenty of room for the operator. The only instruments needed are a very sharp knife, a pair of artery forceps and some strong thread for ligature. I made an incision half an inch back from the mortified part to make sure that all the diseased portion would be removed by the first sweep of the knife. I made an incision about two inches deep, then secured the large arteries, secured the vessels, and so on until all was removed. To stop bleeding from small vessels, I bathed the surface with cold water, sugar of lead and carbolic acid, as follows: Cold water, one pail; sugar of lead, one ounce; carbolic acid, half an ounce. In a few minutes hemorrhage ceased. I gave the animal another dose of stimulating medicine as before, and then allowed it to rise. She drank a little cold water and in an hour's time was grazing, and recovered rapidly. The after treatment consists in using the following: Linseed oil, one pint; carbolic acid, half

an ounce; camphor gum, half an ounce; mix and shake up well, and apply a little to the raw surface twice daily with a feather until healed. This affection in some cases may become chronic; that is, instead of forming matter it hardens, and no milk will be secreted by that portion, and the cow is said to "have lost part or the whole of her bag." In order to prevent this the udder should be treated even in mild attacks of mammitis, and this stage of the disease will always be avoided. In cases where it has taken place, it usually can be relieved by using the following ointment: Iodine, pure, two drams; lard, pure, two ounces; mix well and rub a little of it on the affected part every second day until it becomes soft. The teats or teat require to be drawn and emptied of any curdled milk that may be in them or in that part of the udder.

Diseases and Injuries to the Teats.—First: Obstructions, such as small, hard bodies, supposed to be small glands hardened, which find their way down into the tube of the teat, thus partially or wholly stopping the flow of milk. They are very troublesome and not easily removed. The operation in trying to remove them would likely set up inflammation of the lining membrane of the tube of the teat and the quarter of the udder, usually resulting in the loss of part of the bag. The only safe remedy is to use the milk tube. I have succeeded in some cases in pushing this hard body up into the udder, where it remained. If you do not succeed in this, it will be necessary to use the tube

at each milking, and by the next season they usually disappear.

Warts on Teats.—Warts are sometimes found on the teats and are somewhat troublesome, and the act of milking usually makes them sore, and in some cases they appear on the end of the teat, obstructing the flow of milk.

Treatment: Put on a silk ligature tight around the neck of the wart; in a few days it will slough off. After it has sloughed off apply a little terchloride of antimony to it once with a feather. In some cases the warts will be flat with no neck. These should be scarified with a knife and a little antimony applied, or the part touched with nitrate of silver every third day. They will usually disappear. When removed in this way they are less liable to return than by the knife. After the warts have dropped off and the roots touched with antimony the best dressing to heal the parts is the following: Tincture of catechu two ounces, carbolic acid two drams, water eight ounces; shake up well and apply a little twice daily. Use the milk tube to draw off the milk until the teats are healed.

Chapped or Cracked Teats.—These are also troublesome, as they are painful to the animal and make them uneasy while being milked. The milk tube should be used, as milking with the fingers keeps the cracks open. Use the same kind of dressing as for the above. If the calf is sucking its mother and the teats become chapped it will be necessary to keep them apart at intervals and

wash and dry the teats (after the calf has cleaned the udder out). Apply a little of the above lotion. For all injuries to the teats, if the wounds are not deep, nothing is better than the lotion recommended above, applying a little of it twice daily. For deep wounds, especially those which penetrate the tube of the teat, allowing the milk to exude, the edges must be brought together. This is best done by passing a pin through the lips of the wound and tying a piece of thread in the form of the figure eight, thus bringing the lips of the wound close together. Cut the point of the pin after the thread has been tied to prevent it from getting displaced. The milk tube must be used to draw off the milk in case of disturbing the pin until it heals. If the pin should slough out before the parts have united I have succeeded by paring the edges of the lip and pinning up the wound as at first. No dressing is required in this operation. All plasters and healing medicines recommended by some writers should be avoided.

Bloody Milk.—At times a cow will give milk tinged with blood. There are several causes for this: A congested condition of the glands of the udder in one or more of its quarters; a spongy state of the glands, from which a little blood will ooze on the parts being pressed; also from small sores in the tubes of the teat or teats, and when the teat is drawn in milking a little blood will exude, coloring the milk. If it is caused by congestion or by a spongy state of the glands, bathe it for ten or fifteen minutes with cold water after

each milking, and rub on a little camphorated liniment; continue this for a few weeks. Also give the cow a teaspoonful of sulphate of iron in a mash in the morning and one dram of iodide of potassium in the evening in the drinking water for several weeks. If it is from sores in the teat tubes use ten grains of tannic acid, water one ounce; inject a little of this after each milking.

Cow-Pox (Variola Vaccine).—This very simple affection is not often noticed, and so many forms of eruption are observed on the teats that it is somewhat difficult to detect the true from false varieties of cow-pox at certain stages of the eruption. This disease has claimed a very large share of attention on the part of scientific men. From Jenner's discovery in the dairies of Gloucestershire he observed that the people milking cows with the cow-pox suffered from an eruption on their hands, but never had the malignant smallpox of the human being. This was the origin of vaccination. The cow-pox, like other forms of variola, is a contagious pustular eruption of the skin, running a very regular course, accompanied by slight fever. It is communicable between animals of different species.

Causes: The primary cause of cow-pox is unknown. The majority of cases occur in spring and summer, shortly after cows have calved. The state of congestion of the udder at this period favors the development of this disease, and it never has been observed to arise spontaneously in bulls, oxen, or

heifers before calving. It is chiefly seen in cows from four to six years of age. Mr. Ceely makes the following sensible remarks on the cause and origin of this disease. Referring particularly to the Vale of Aylesbury he says: "The variola vaccine seems to have been long known in the Vale and neighborhood. They have been noticed at irregular intervals, most commonly appearing about the beginning or end of spring, rarely during the height of summer, but I have seen them at all periods from August to May and the beginning of June. By some it is presumed that cold and moisture favors their development, by others that the hard winds of spring after a wet winter are supposed to have the same influence. I have, however, seen the disease in the autumn and middle of winter after a dry summer. The disease is occasionally epizootic or prevalent at the same time in several farms at no great distance; more commonly sporadic or nearly solitary. It may be seen sometimes at several contiguous farms; at other times one or two farms apparently under like circumstances of soil, situation, etc., amidst the prevailing disease entirely escape its visitations. Many years may elapse before it recurs at a given farm or vicinity, although all the animals may have been changed in the meantime. I have known it to occur twice in five years in a particular vicinity and at two contiguous farms, while at a third adjoining dairy, in all respects similar in local and other circumstances, it had not been known to exist for forty years. It is

sometimes introduced by milch heifers. It is considered that the disease is peculiar to the milch cow, that it occurs primarily while the animal is in that condition, and that it is casually propagated to others by the hands of the milkers. But considering the general mildness of the disease, the fact of its being at times in some individuals entirely overlooked and that its topical severity depends almost wholly on the rude tractions of milking, it would perhaps be going too far to assert its invariable and exclusive origin, under circumstances just mentioned, yet I have frequently witnessed the fact that stirks, dry heifers, dry cows milked by other hands, grazing in the same pasture, feeding in the same sheds, and in contiguous stalls, remain exempt from the disease. Many intelligent dairymen believe that it occurs more frequently as a primary disease among milch heifers, but I have not been able to confirm this remark by my own observation. It does not appear to be less frequent on hills than in the vale. It has been seen primarily on the stall-fed as well as on the grazing animals.

Origin of the disease: I have met with several intelligent dairymen whose relatives had some good reason to ascribe its occurrence to the contagion of the equine vesicle communicated by the hands of the attendants of both animals, but very little of this disease has been noticed of late years, although I know of several farriers who have been affected from the horse and resisted subsequent variolation or vaccination, and I have seen a

few distinguished between the equine and the grease, a recurrent disease (eczema impitigonoedes), as it appears to me for many years past. However, the spontaneous origin of the variola vaccine in cows has not been doubted here. In all the cases that I have noticed I never could discover the probability of any other source. There is much difficulty in determining with precision at all times whether the disease arises primarily in one or more individuals in the same dairy. Most commonly, however, it appears to be solitary. The milkers pretend in general to point out the infected individual, but as I have more than once detected the disease in a late stage on an animal not suspected of having it, I am not very prone to confide in these representations unless my own inspection confirms or renders them probable.

Symptoms: There are general signs of mild fever, and the characteristic symptoms are purely local. Constitutional symptoms have been described in some cases as follows: Sudden sinking or loss of milk, dribbling of saliva from the mouth and frequent inflation and retraction of the cheeks, staring coat, arched back, limbs drawn together, and rapid loss of flesh. In about three or four days red, hard spots are seen, which soon appear circumscribed, the teats become painful and slightly swollen, the spots attain the size of a horse bean, and milking becomes generally very painful to the animal. They rapidly increase in size and tenderness and become charged with limpid fluid and are surrounded by a red base. The limpid fluid be-

comes opaque and purulent, and the distinctive features of the pustule is that it has a depression on its summit. It is technically termed "umbilicated." It is most perfect about ten days after its first appearance. (Gamgee.)

Treatment of cow-pox: On account of the soreness of the teats it is almost impossible to milk with the hand and the milk tube should be used. If there is much fever a dose of physic should be given. One pound of Epsom salts and an ounce of ground ginger dissolved in half a gallon of cold water at one dose. After the physic has operated give half an ounce of nitrate of potassium twice daily in the drinking water for three or four days. If the udder is swollen and hot bathe it with hot water for half an hour three times daily, and after each bathing use a little of the following: Acetate of lead one ounce, water one quart; mix and apply. If there is no fever and no swelling of the udder, only the eruption on the teats, no treatment is required. Use the milk tube to draw off the milk, care being taken not to disturb the vesicles. It runs its course in two weeks if not irritated.

Milk Fever in Cows.—This is a disease peculiar to the cow. Gamgee and others who have written on this subject are of the opinion that there is present in the blood a specific element. Some attribute the disease to accumulations of milk—producing elements in the blood giving rise to fever and, practically, blood poisoning—or to the sudden overloading of the system with blood, causing nervous disorder. Again, another says that at

the period of parturition, when the act is rapidly accomplished, a large excess of blood is thrown upon the system. The effect is the same as when a flux of some standing is suddenly checked; either some of the excretory organs exert their power of vicarious actions, or a sudden increase of blood pressure takes place. This is the view that is usually taken, but I think it is a wrong one, as in every cow, at the time of parturition, there is this excess of blood thrown back upon the system, but nature has provided for this. It is quite another thing in the case of the flux; that was checked by administering powerful astringents, which is acting contrary to nature. Still another thinks that it is such a derangement of the sympathetic nervous system as seldom to admit of recovery until (finally) apoplectic lesions result. The first part of the above, I think, is nearest to the point, but the latter part is the stumbling block over which nearly all fall—that is in believing the nervous derangement causes apoplexy. When I commenced practice, some twenty-five years ago, I followed the teaching I have just mentioned, and my milk fever patients nearly all died. This state of affairs provoked me very much. I made a number of post-mortem examinations of the animals that had died of the disease, and failed to find the apoplectic lesion described. Of course I found redness and some fullness of the blood vessels, but no more than one would find in making a post-mortem examination of animals dying of other diseases not apoplectic. I concluded from this that the dis-

ease was not congestion of the brain and spinal cord. I then took up the nervous theory, and was supported by the following facts: First: The cows which became affected with this malady are nearly all very fat and flabby, while in some few cases the animals are very thin and weak. Such animals are barely able to cope with the violent strain and nervous exhaustion which take place at this period. Second: The season of the year most fruitful of this disease is in the warm, enervating weather of the spring and early summer, when the grasses are soft and succulent, which increases the flabby condition of the already too soft animals. Taking these facts into consideration, I changed the treatment from bleeding, sedatives, violent purging, and applying ice to the head, etc., as directed by most veterinary writers (I do give purgatives still, but merely to assist in moving the bowels when the animal gets over the attack), to powerful stimulants from the earliest stage of the disease, or whatever time I may first see the animal and the disease has not been too far advanced, and now I never lose a case of the so-called very fatal disease.

Symptoms: The symptoms of this disease are characteristic. In the early stage (which is generally a few hours after calving) the animal will be noticed shifting its weight from one hind leg to the other. This she does continually, and if made to move will show weakness in the hind quarters, and if forced to walk will fall, but may be able to regain her feet with difficulty. In a short time

the animal falls, and is then unable to resume the standing position. There is some constitutional disturbance, and after being in this state for some time the breathing becomes accelerated and the pulse quickened. As the disease advances the brain becomes affected, which is evinced by the animal tossing her head in a violent manner. At other times the animal presses its head against the shoulder or side, and if an attempt be made to draw the head forward it will, as soon as released, fall suddenly back into its former position, the neck presenting a peculiarly stiff appearance not observed in any other disease. The eyes very soon become insensible to light, presenting a glassy appearance, and if touched with the finger or other object every sign of sensation will be absent. In some cases the power of swallowing is lost. At this stage the animal, if not promptly attended to, soon dies. This is generally the case when treated as directed by most veterinary writers. By the method of treatment which I have followed for the last few years I do not lose a case when seen in time.

Treatment: Aromatic ammonia ten ounces, spirits of nitrous ether twenty ounces. This is enough for ten doses, three ounces to be given every half hour till five doses are given; then one ounce every hour until the remainder is administered. Each dose to be given in half a pint of cold water. This may look like a large quantity to be given, but this is what is necessary to stimulate the nerves into action. I also give from one to

one and one-half pounds of Epsom salts, with one ounce of ginger, the whole to be dissolved in half a gallon of water and given at one dose. Also mix a half pound of good mustard with warm water, rub this over the loins and cover up with a rug. This I do to assist in stimulating the spinal cord. After doing this the animal generally lies quiet for about eight or ten hours, when she will get up. If she does not, give more of the above, three ounces every hour until four or five more doses are taken. Then wait for several hours, when it is likely the animal will be able to rise. I have had to do this in some few cases. In this case no after treatment is required. In some cases the animal becomes lively and commences eating, but remains unable to get upon her hind legs. It is then necessary to give nux vomica in dram doses three times daily for a week in gruel.

Prevention: The best prevention of this disease is to keep the cow in a good, firm, healthy state, and not to have her too soft and flabby. This can be done by giving the animal good solid food and not too much of it. In the spring, when the weather is getting hot and the grass long and succulent, keep the cow off such pasture and put her in a place where she cannot get much grass, and have a stable for her and feed dry, solid food, as hay, oats or corn. Soft, sloppy diet is not good. If the animal is fat it would be well to give her one and one-half pounds of Epsom salts about ten days before calving. It is not wise to give it at or a few hours before calving, as it weakens the ani-

mal. This treatment I have advised for several years, I think with beneficial effects, as parties who used to lose cows have, since they adopted this plan, not been troubled with milk fever. If the udder is full and hard I would milk the cow before calving in all cases, as it prevents garget and does the cow no harm afterward.

CHAPTER XXVII.

MANAGEMENT OF THE FOAL AND CALF.

There are a great many foals lost every year from want of attention at the time of the birth of the young creature and for a few days thereafter. It is necessary to detail a trusty man to do this, The mare, if in the stable, should have a good, roomy place separated from the other horses. It should have plenty of clean short straw, and if the weather is cold it should be made as warm as possible and the foal rubbed dry, and in some cases covered up with warm blankets until it is thoroughly dry. There are many colts destroyed from want of a little care at this stage, as the young creature is very likely to suffer from swollen joints a week or two hence from the exposure to the cold and in some cases dies from inflammatory rheumatism. Do not be in a hurry to separate the foal from the afterbirths, as in some cases the navel cord is thick and strong. Let the foal flounder about for a while, and in the majority of cases it will break off at the proper place, and on account of it being twisted off there will be very little hemorrhage. I have known of a few cases in which the cord was cut and a ligature put on and inflammation set in, causing the death of the foal. There are very few cases but what will divide if left alone. Dust a

little prepared chalk on the cord. This will dry it up, causing it to shrivel much faster than if it was left alone. It has been said that colts born in the barn yard, and dirt and bacteria getting on the navel before it is dry, is the cause of a number of deaths. They give the symptoms as a form of blood poisoning, causing swelling of the joints; but I have seen a great number of colts affected with swelling of the joints which had no connection whatever with the navel cord. There are thousands of colts born in the barn yard, and not one in a thousand is affected with the derangement above mentioned. The reason I recommend the use of the chalk is it causes it to shrivel up much quicker and there is less danger of a bunch being left at the navel. By a non-closure of the urachus (the tube leading from the base of the bladder of the foetus) the urine will be partly or wholly passed through the navel opening. It is recommended to tie the cord, or if that is too short to stitch up the opening. I think this is a bad plan, as the majority that are so treated die. The urine accumulates in the tube, and, as it cannot escape, sets up inflammation, ending in death. I find it is much better practice to apply prepared chalk to it for a few days, or use tannic acid twenty grains, water one ounce; apply a little twice daily. In this form of treatment the urine that finds its way into the tube will drop out, and from the astringent and drying properties of the chalk and tannic acid and time allowed, the tube closes without any bad result.

Constipation.—This is a troublesome and dangerous condition in newly born foals. There is an accumulation of very hard material in the bowels of the foetus called "meconium," and in some cases the young creature has not strength enough to expel it, and will give rise to colic, and will cause death if not relieved. The foal should be watched, and if it cannot expel this accumulation use injections of warm water and soap. Do not put any salt in the water; it is not necessary to do so, and there is danger of it causing irritation. If you do not succeed with the injections give two ounces castor oil, or four ounces raw linseed oil at a dose. If from some cause the foal does not get its mother's milk and has to be fed on cow's milk, one-third water should be added and a little brown sugar, enough to sweeten it. It should only have about a pint at a time, and receive it every hour for the first twenty-four hours; then more at a time and not so often, and so on, and after two or three weeks it can get all it wants. Flaxseed boiled into a pulp and mixed with the milk is very excellent, as it is nutritious and prevents the milk from becoming too hard in the stomach. I have known foals to be killed by getting a large quantity of cow's milk before the stomach became accustomed to it. If this is not properly attended to it will likely cause diarrhoea or constipation.

Diarrhoea.—This is a very common complaint in the foal, caused by the food the mother has eaten or something the colt has itself gotten. In cases where the mother has been separated from

the foal for several hours, the colt being hungry and its stomach being weak, it takes more milk than it can digest, resulting in diarrhoea. In cases where it is necessary for the mare and foal to be separated for any length of time it will be necessary to milk the mare, so that the colt will not get too much, or let the colt take a little, then keep it away for a while until the stomach is strengthened, then let it take more. There is very little to fear on account of the milk being a long time in the udder, as no change takes place in the milk as long as the udder does not inflame. Even then it does not seem to do either the calf or foal any harm. In the early stages of diarrhoea it is best to give the foal two ounces castor oil and a teaspoonful of tincture of opium, and change the food of the mother from grass to dry hay and good oats if that has been the cause. If the oil does not cure it after it has operated, give tincture of opium two teaspoonfuls, tincture of catechu one tablespoonful, chalk a tablespoonful; mix this in half a pint of starch gruel. Repeat in three hours if not checked. If the diarrhoea should be very severe, with large quantities of very liquid feces, give powdered opium twenty grains, camphor twenty grains, acetate of lead ten grains; mix in a half pint of starch gruel. Repeat this every third hour until checked. If constipation should follow give boiled flaxseed.

Diarrhoea in Calves (White Scours).—If the calf is not allowed to suckle its mother great care is necessary in feeding it. If it gets too much milk,

or if the milk is skimmed, there is great danger of it forming a solid coagulum, or it may be in coagulated pieces, and these become so hard that gastric juice takes no effect on them, or the hard pieces may form in the intestines, causing irritation, resulting in diarrhoea of a very offensive kind. I have prescribed for cases of this kind, and usually relieved them. I have made post-mortem examinations of calves dying from this disease and found masses above mentioned so hard and large that it would be impossible for them to pass through the bowels. There are also acid secretions that form in the intestines, causing the milk to curdle, separating it into curds and whey, producing what is known as "white scours" in calves, causing them to lose flesh very rapidly, and in some cases death. To prevent this the calf should be fed often and in small quantities, for the first few days, on milk from as fresh a cow as possible. After the calf is a few days old it should have some boiled flaxseed mixed with its milk. (Oil meal is not good.) Boil a teacupful of flaxseed in three gallons of water into a pulp, and when it is cool mix a teacupful of this pulp in each calf's milk. This will prevent it from forming into a hard lump, and it is very nutritious. If the animal should get into the condition above mentioned, it will be necessary to give it a dose of castor oil from two to four ounces, according to the size and age of the calf. The oil should be made into an emulsion, with two drams of bicarbonate of potassium and sufficiency of water. This should be succeeded by giving half a

pint of lime water two or three times a day in a small quantity of milk, until the acid condition of the bowels has passed away, which will be known by the better color of the feces and the absence of the sour smell. Give the syrup of the phosphate of iron in tablespoonful doses in the milk and flaxseed tea. Cod liver oil is a very useful medicine, and if the animal is valuable the expense would be repaid by the successful result. If this mild constitutional treatment is not sufficient to stop the scours give a tablespoonful of tincture of opium and tincture of catechu at a dose in starch gruel and repeat it every four hours until it is stopped. Or give at a dose powdered opium twenty grains, acetate of lead ten grains, mixed in starch gruel. Repeat every fourth hour until checked. The calf should be kept in a good, dry, warm place.

Bent Ankles.—Although at birth the bones of the legs are usually strong enough to support the weight of the animal, yet we frequently find that the foal's fore legs at the ankles are bent forward, and in a few cases they will come in contact with the ground and soon become raw sores. The cause of this is, the ends of the bones have not become solid enough to be able to sustain the weight and they bend forward as above mentioned. It is very difficult to remedy. If splints or bandages are applied, in a few days the skin underneath the bandage will scald, and being very tender may peel off, leaving a sore difficult to heal. My experience has been to keep the mare confined to a

small space and have it as soft as possible. Bathe the legs twice a day with tannic acid half an ounce, alcohol half a pint, water half a pint; mix. This will stimulate and harden the skin. Use no splints or bandages. The mare should get good oats twice a day, and a bran mash, with a dessert-spoonful of phosphate of calcium in it for a week or two. This will enrich the milk with bone-producing material. It is sometimes mixed with the milk and given to the foal, but it is very apt to derange its stomach, being so young. If the parts should become sore apply a little of the following three times a day: Oxide of zinc one ounce, glycerine two ounces, sweet oil two ounces; mix. Shake up well before applying.

Swollen Joints.—In some colts at the time of birth or soon after there are a number of soft puffs form on the joints, especially on the knee joints and stifle. They are soft to the touch, with no heat or tenderness; they do not seem to cause any suffering to the colt; it grows and runs about as if nothing was the matter. It is caused by an infusion of fluid in the bursae of the joint, and where tendons play, and as the animal grows, in the majority of cases, it will disappear without any treatment. If it does not, rub the parts once a week with biniodide of mercury one part, lard twelve parts.

Rheumatism.—It is a common occurrence to find colts from two weeks to two months old suffering from rheumatism of the joints, causing lameness, fever, great weakness, often resulting in

death. The kidneys often become affected, causing either partial suppression of urine or a very great increase of it; matter may form in the inflamed joint or joints, causing its distension.

Symptoms: Swelling in the joints, which are hot and painful to the touch; the colt does not want to stand, lies nearly all of the time, it is fevered and there is loss of appetite, the bowels are either constipated or there will be diarrhoea. If not relieved it soon becomes much emaciated and dies.

Treatment: It is necessary to give medicine to reduce the fever and remove from the system the material causing the rheumatism, and for this purpose nothing seems to act so well as repeated doses of nitrate of potash, for the foal two or three drams of the nitrate of potassium given dissolved in half a pint of cold water three or four times a day and continued for a few days. After this give a tablespoonful of wine of colchicum three times daily. The joint should be rubbed with cantharides two parts, lard six parts; repeat in three days if needed. If the colt will not stand it should be held up to suck five or six times a day. See that it is kept in a warm, dry place, as lying on the cold earth while in this condition we cannot expect the treatment to be of any avail.

Weaning the Colt.—This should be done in the fall before the weather gets too cold, as the change will be great from getting the warm milk from the mother to feeding entirely on cold grass. In order to keep the colt from falling off in flesh

after being weaned it should have a little ground oats mixed with bran once or twice a day, and have access to plenty of clean water, and if possible should be sheltered from the cold rains of autumn, as being exposed to a chilly rain will not only reduce it in flesh, but may cause rheumatism, ending in destroying some of the joints. During the first year at least, the colt should be well fed, as this period does a great deal in shaping the future horse. In order to do this it should have at least two quarts of oats three times daily. Oats are much better food than corn for a young growing colt, as they contain more of the elements which go to make muscle and bone than any of the other cereals. There is an idea that there is danger in feeding oats to foals, but it is a great mistake. Some of the best foals which I have raised got as much as eight or ten quarts a day. Bran is also good for foals. It not only keeps their bowels in good condition, but also assists in giving nutrition. There is really more nutrition in bran than is generally supposed. Steep a pail of bran in water over night and then boil the water and you will find that it has given up a good deal of glutinous matter, besides lime salts, which go to build up bone and other tissues of the body. Clover hay is much better for colts and horses than timothy. It wants to be fed in smaller quantities. Colts will eat too much of it if they can get it, and in this case it may make them pot-bellied, and in some horses may produce heaves, but if it is fed as it ought to be there will be no danger of

this, and your colts will come out much sleeker and better in every way if they get a fair supply of oats and good clover hay. This I know from actual experience.

Parasitical Bronchitis, Husk or Hoose in Calves.—Parasites in the trachea and bronchial tubes frequently occur in calves under a year old; it is seen sometimes among older animals, but seldom proves fatal in them, but it sometimes causes great mortality among young calves. These parasites are known as "strongylus mecrurus," and are sometimes found in the lungs of the ass. Williams says that he has found them in the heart and blood vessels. Hence it is inferred that they arrive at the lungs by entry of the alimentary canal with the food, boring a passage into the blood vessels, passing with the current of blood through the blood vessels, and from the latter into the bronchial tubes. There are a great many different opinions as to how the parasites get into the bronchial tubes, and it is said that in wet seasons animals pasturing on low, wet land are liable to be attacked by them, and I have no doubt but what there is some truth in it; but I have seen them in calves kept in a dry place in the barn yard and during the early spring months before they had any grass.

Symptoms: Usually there is at first a cough of a very distressing nature and of a special hacking and paroxysmal character. There is a discharge of stringy mucous caused by the severe coughing. After the paroxysm the animal gets relief for a

short time. The parasites can be found in the mucous that is coughed up by the aid of a strong glass. This disease is of a very exhausting nature and the animal becomes rapidly emaciated, and diarrhoea sets in as a complication. Steel says: "The parasites imbedded in stringy mucous lie intertwined in groups, or stretched against the bronchial mucous membrane. When in balls they block up the air passage. They also cause spasms of the bronchial tubes. Thus they seriously impede respiration, which is always remarkably labored in this disease." The usual duration of the attack is about two to three weeks.

Treatment: Collect all the affected calves and put them into a house, then close the doors and windows, then put coals of fire into a pot and put a pound or two of sulphur into it; remain in the house with the calves and keep the doors shut as long as you can stand it. Then the pot containing the burning sulphur is removed and the animals left exposed to the gas for a quarter of an hour or so, then let them out. Also give each half a dram of sulphate of iron in a little gruel in the morning, and from half to an ounce of spirits of turpentine in a little oil in the evening; feed on good food. All the bedding and other materials on which there is any chance of the discharge getting should be destroyed, as it may contain some of the larvae, and if it should be eaten by other animals there is a possibility of their getting the disease in this way.

CHAPTER XXVIII.

DISEASES OF THE GENERATIVE ORGANS.

Gonorrhea (Inflammation of the Urethra).—This is not a common disease in the domestic animals and can usually be traced to contagion, also from the female animal having a chronic discharge from the vagina, caused by weakness of the mucous membrane of it.

Symptoms: A desire to urinate often, a discharge of a thin, bluish white matter from the urethra or the vagina, sometimes swelling of the parts, and ulcers on penis, with an oozing of a very foul-smelling matter from the ulcers.

Treatment: Wash the parts well with warm water and soap, then apply a little of the following: Acetate of lead half an ounce, sulphate of zinc half an ounce, carbolic acid half an ounce, water one quart; use a little of this to the external surface three times a day and inject a little of the following twice daily: Nitrate of silver ten grains, distilled water two ounces. A glass syringe should be used for this lotion. This should be continued until the discharge stops. If the ulcers do not heal in a few days touch them with nitrate of silver in pencil form once a day for a few days, then use the above lotion. Give one ounce fluid extract buchu and two ounces sweet spirits of

nitre at a dose in half a pint of cold water twice a day for a few days. If the animal is in poor condition mix and divide into twenty-four doses sulphate of iron four ounces, nitrate of potassium four ounces, nux vomica two ounces. Give one night and morning in a bran mash.

Phymosis.—This is a morbid condition of the sheath. Phymosis is usually the result of an injury to the sheath or its vicinity. It is also caused by an animal standing in the stable without exercise, and overfed, or it may be the result of starvation. It is also caused by an increased supply of the sebaceous secretions, furnishing material for dust and other dirt to accumulate on.

Symptoms: Swelling of the sheath to such an extent as to cause it to almost close its opening.

Treatment: Bathe the part with hot water for half an hour three times a day and use acetate of lead half an ounce, tincture of arnica two ounces, water one quart; shake up well and apply a little after each bathing. Suspend the sheath by putting a broad piece of cloth around the loins and under the sheath. This will relieve it very much. If it is left hanging pendulous it will retard the cure. If it is caused by the animal standing in the stable without exercise, or if very fat, give aloes one ounce, ginger half an ounce, carbonate of soda half an ounce, dissolve in half a pint of boiling water, add half a pint of cold water, and give at one dose. Follow this by giving half-ounce doses of nitrate of potassium. If the animal is thin use sulphate of iron four ounces, nitrate of potassium

four ounces, nux vomica two ounces, divide into twenty-four doses and give twice a day in bran mash.

Paraphymosis.—This is a condition in which the penis is swollen and cannot be contracted or withdrawn within the sheath. It is caused by the part being injured, or from weakness associated with debility of the animal, and sometimes from paralysis.

Symptoms: A portion or the whole of the penis hangs out of the sheath, swollen sometimes to a great size, and of a reddish brown color; and if acute inflammation is present it will be extremely painful; at times it is cold and not painful. If it is not properly treated it may become gangrenous. Sometimes there is a condition in old horses in which it hangs out pendulous and does not swell. In this case there is no cure, but it ought to be amputated.

Treatment: The first thing to do is to suspend it by putting a wide bandage around under it and fastened over the loins. If it is hot and tender keep it constantly wet with a lotion of acetate of lead half an ounce, tincture of opium two ounces, water one quart. If it is cold and has blisters on it scarify it and foment with hot water for half an hour three times a day, then rub on a little of the following: Tincture of opium one ounce, fluid extract of belladonna one ounce, water one pint, after each bathing. If the animal is in good condition give the horse one ounce aloes, the bull one and a half pounds of Epsom salts;

also give half-ounce doses of nitrate of potassium three times a day in bran mash. If the animal is weak give sulphate of iron four ounces, nitrate of potassium four ounces, nux vomica two ounces; mix and divide into twenty-four doses, one to be given night and morning in bran mash. Repeat this quantity if necessary. If these remedies fail after two weeks' treatment it will be necessary to amputate it. This is best done by the ecraseur, as it will prevent bleeding; after it is removed treat as for a common wound.

Ulcers and Fungous Growths.—Occasionally open ulcers will be found on the penis which will not heal by the ordinary treatment. The ulcerated parts should be touched with nitrate of silver once a day for a few days, then apply a little of the following to the parts twice a day: Oxide of zinc one ounce, glycerine two ounces, mix.

Fungous Growths. These are very foul-smelling tumors which are sometimes seen on the penis and are troublesome to treat. If there is a neck to the tumor tie a small piece of cord tight around it, or if it is large it is best to remove it by the ecraseur. After its removal apply a little terchloride of antimony to the part every second day for a week to destroy the roots, then use a little of the above medicine to heal it. In cases where the fungous is growing all around the penis it will be better to amputate it above the fungus with the ecraseur and treat it as before mentioned. Fungous growths around the margin or in the vagina are to be treated in the same way.

Orchitis (Inflammation of the Testicle).—This disease is caused by injuries to the part, such as blows, bites from other horses, wounds penetrating the testicle. It is also caused by feeding too much stimulating food in hot weather or medicines that stimulate the generative system, such as cantharides, rue, tansy, dameana.

Symptoms: Swelling of the part, which is hot and tender to the touch, the swelling often extending down the legs. The animal suffers pain when made to move. This disease can be easily distinguished from hydrocele (water in the pouch) by the swelling being hard and hot and very tender, while in hydrocele it is soft and will fluctuate under the fingers.

Treatment: Give the horse aloes one ounce, the bull one and a half pounds Epsom salts. Follow this by giving half an ounce nitrate of potassium three times a day in bran mash. If the appetite is good put it in its food. Bathe the part three or four times daily with hot water, and after each bathing use a little of the following: Acetate of lead half an ounce, tincture of arnica two ounces, water one quart. If matter should form, which can be known by the part becoming soft, and pitting with the finger, then open it with the knife, squeeze out all the matter and wash it out with water, then inject a little of the following: Peroxide of hydrogen one ounce, water four ounces. Do this twice a day to heal it. If it will not heal it will be necessary to castrate the animal. If it should remain swollen and hard after the inflammation

is relieved use iodine two drams, vaseline two ounces; mix and apply a little twice a week, and give one dram of iodide of potassium in a bran mash twice a day for a month if necessary.

Hydrocele (Water in the Scrotum).—This derangement is sometimes the result of inflammation of the scrotum or by the walls of the scrotum being bruised.

Symptoms: The scrotum is swollen and will fluctuate under the fingers, and the testicles can be felt floating in the water.

Treatment: If it is not interfering with the animal's health and not increasing in size it will be better left alone. Astringent medicines may be tried, such as tannic acid, twenty grains to the ounce of water. The proper treatment is to draw off the fluid with a hypodermic syringe, the nozzle of which is passed through a solution of carbolic acid. But this should be done only by a veterinarian.

Leucorrhoea (Whites).—This derangement is caused from a chronic inflammation of the lining membrane of the vagina, producing an exudation of a white glutinous substance from it. The discharge varies in amount, also in its consistency; at times it will be thin and of a bluish white color, and at others thick and white. If there are ulcerations of the membrane the discharge may be mixed with blood. In some animals there is a constant excitement and the animal loses flesh.

Causes: Contagion, debility and old age, and having a scrofulous tendency.

Treatment: Clean out the part with injections of warm water, then inject a little of the following: Sulphate of zinc half an ounce, carbolic acid half an ounce, water one quart. The part should be cleaned once daily. If there are ulcers they should be touched with nitrate of silver every second day until healthy. Sometimes if it is not improving change the lotion to peroxide of hydrogen two ounces, water four ounces. Inject at once. Repeat every day. Give the animal two drams of sulphate of iron and half a dram of nux vomica in a bran mash twice a day for two or three weeks.

Chronic Enlargement of the Testicles.—This occurs sometimes in stallions that are overfed and have not sufficient exercise. It is supposed to be caused by a chill or from being bruised, but not severely enough to cause inflammation. The growth is usually slow, but by degrees they become very large, and usually their function is not interfered with.

Treatment: If the animal is fat give it a dose of aloes. Follow this with dram doses of iodide of potassium twice a day in bran mash, and continue it for two weeks, then skip a week and give again, and so on for several months. Mix ichthyol one part, vaseline two parts; rub a little of this twice a week on the testicles, and continue it for several months. This plan of treatment if properly carried out is usually successful.

CASTRATION.

The best time for the operation is when the colt is one year old, in the calf when it is one month old. The latter part of April or the month of May is the best time of the year, when it is neither too hot nor too cold. Colts that are thin and low in the neck ought not to be operated upon until they are two years old.

Rules to guide the operator: First. Examine the scrotum to see if there is a rupture, or if the testicles have come down. If not it will be wise to wait for a few months longer. Second. Never operate on a thin or an unhealthy colt. Third. Do not operate during cold, wet weather. Fourth. An animal that is confined in badly ventilated stables should not be operated upon. Fifth. If a colt is thin it should have two or three quarts of good oats a day for a few weeks before being operated upon. Sixth. The hands and instruments should be clean. Seventh. When an older animal is to be operated upon it should be exercised or worked moderately for some time before the operation, or if very fat should have a dose of physic a week before, and allowed a regular allowance of oats, as it does not do to starve an animal before the operation.

There are several methods of performing the operation, but those used at present are either the clamp or the ecraseur. My experience is that the clamp is the safest and best, as there are fewer bad results after it than the ecraseur. The kind of

wood is not of much importance as long as it is grooved and strong enough not to bend. A caustic is usually placed in the groove. I use bichloride of mercury one part, and flour six parts, made into a paste with water. It is best to prepare it when you are going to use it. The clamp should be put well down on the cord and tied tight at both ends. Some have the idea that it gives the animal more courage to leave the cords long, what they call "Proud." This is a mistake, as when the clamp is taken off the end of the cord may hang out and become diseased. The clamps should be left on for twenty-four hours, and when taken off the cord should be pushed up into the cavity. When rupture is present the outer skin only should be cut and pushed back, the testicle drawn up, the bowel pressed in, and a clamp put on, without any caustic on it, and left on until it sloughs off. Another method is to push the bowel in and put only one clamp over skin and all, and let it remain on until it sloughs off. I think this is the best way. If a clamp should come off and bleeding take place it will be necessary to cast the colt, find the cord, and put on the clamp again. If the bleeding is not very great it is best to keep the animal quiet for a while and it may stop of its own accord. I have seen several cases in which it stopped without interference. If the cord cannot be found and the bleeding is very copious stop it by taking some cotton batting and wetting it with tincture of chloride of iron or carbolic acid one part, oil or glycerine two parts, and pushing this into the

pouch and sewing it up. I usually let it remain in for twenty-four hours, then remove it carefully and there is no more trouble.

Swelling of the Parts.—Sometimes swelling occurs after the operation. It may be severe or only slight, and this can, in the majority of cases, be prevented by giving the animal exercise or turning it out to pasture. It is usually caused by the cuts closing too soon, preventing the escape of blood and serum that will accumulate if the openings close too soon. This is one of the advantages of using the clamp, as it keeps the cut from closing, as the end of the cord is through it for twenty-four hours, and when the clamp is taken off and the end of the cord pushed up this opens any part of it that might have closed. The swelling may be caused from using dirty instruments. When the swelling is great the parts should be bathed for half an hour several times a day and a lotion made of acetate of lead half an ounce, tincture of opium two ounces, water one quart, applied after each bathing. Open the cuts with the fingers and wash out with warm water and carbolic acid, a teaspoonful to the quart of water. Sometimes it is necessary to suspend it when it is much swollen. Give the yearling colt one dram of nitrate of potassium in a mash three times a day. Give a two-year-old two drams, and a horse four drams. This treatment will usually relieve the swelling.

Champignon, Scirrhus of the Cord, or Sarcocele. —This trouble usually arises from the operation

by the caustic clamp, either from the clamp not being far enough down on the cord, or from allowing the clamp to remain on too long, and when it is removed, neglecting to separate the adhesions that have formed between the lips of the wound and the cord; also from paralysis of the cord. When the clamp is taken off see that the cord is pushed up, and if it should hang no time should be lost before it is removed, as when it is exposed to the air it swells and soon becomes hard. The animal should be cast, the cord separated from the lips of the wound and drawn down a little and a fresh clamp put on it as far down as possible, then remove that which is external to the clamp, let the clamp stop on for twenty-four hours, then remove it, pushing up the end of the cord; or it may be removed by the ecraseur. I have removed a portion of the cord that had grown until it was as large as a child's head. The animal did well after its removal.

Chronic Suppuration, or Fistula of the Scrotum. —This is caused by the cord becoming diseased and hard, keeping up an unhealthy action in the scrotum and the formation of a foul-smelling matter. Very often the wound may wholly or partially close, but the matter accumulates within, the scrotum swells, and the old wound opens and discharges copiously for a time, and so on until it is cured, which is best done by casting the animal, opening the scrotum, removing the diseased portion of the cord, and destroying any other un-

healthy tissue in the scrotum by terchloride of antimony; usually one application is enough.

Peritonitis (Inflammation of the Peritoneum.—This is one of the results of castration, and usually ends in death, and is caused by the animal being exposed to cold rains after the operation, although I have seen cases of it when the weather has been hot, when an animal is too fat or too thin. Dividing the cord too high up is said to have a tendency to cause it. It is also caused by injuries to the abdominal walls, and may take place from being injured in casting, and from exposure to cold when heated, even when no operation has been performed.

Symptoms: The animal appears dull and stiff, does not want to move, and if it feels pain it is too sick and depressed to move, the muscles of the belly are tucked up, and the skin is tight, and if pressed on with the hand the animal will evince pain, the breathing is hurried, the pulse quick and hard, and the animal refuses food and water. In some cases it will lie down and roll as in inflammation of the bowels, the legs and ears become cold and the muscles of the face are contracted, which shows that the poor animal is suffering intense agony. Sometimes it becomes delirious or comatosed and dies paralyzed. This form of inflammation resembles erysipelas, and spreads fast over the membrane of the bowels and the lining of the abdominal muscles, taking on a low form of fever, usually ending in death.

Treatment: Give powdered opium in two-dram doses every two hours, until three doses are taken, then every four hours. If the animal is in full flesh and the pulse very hard add fifteen to twenty drops of tincture of aconite, and give it in a pint of oatmeal gruel. The continued application of hot water to the abdomen is useful. If the animal is very restless use mustard made up with hot water instead of the hot water. If the pulse is weak and small and the legs and ears cold give stimulants, such as spirits of nitrous ether two ounces, aromatic spirits of ammonia one ounce, administered in a pint of cold water and repeated every second hour. If the animal should recover it should be fed on boiled linseed and bran mashes for a few days. Give what water it will take cold.

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